Trains

July
1945

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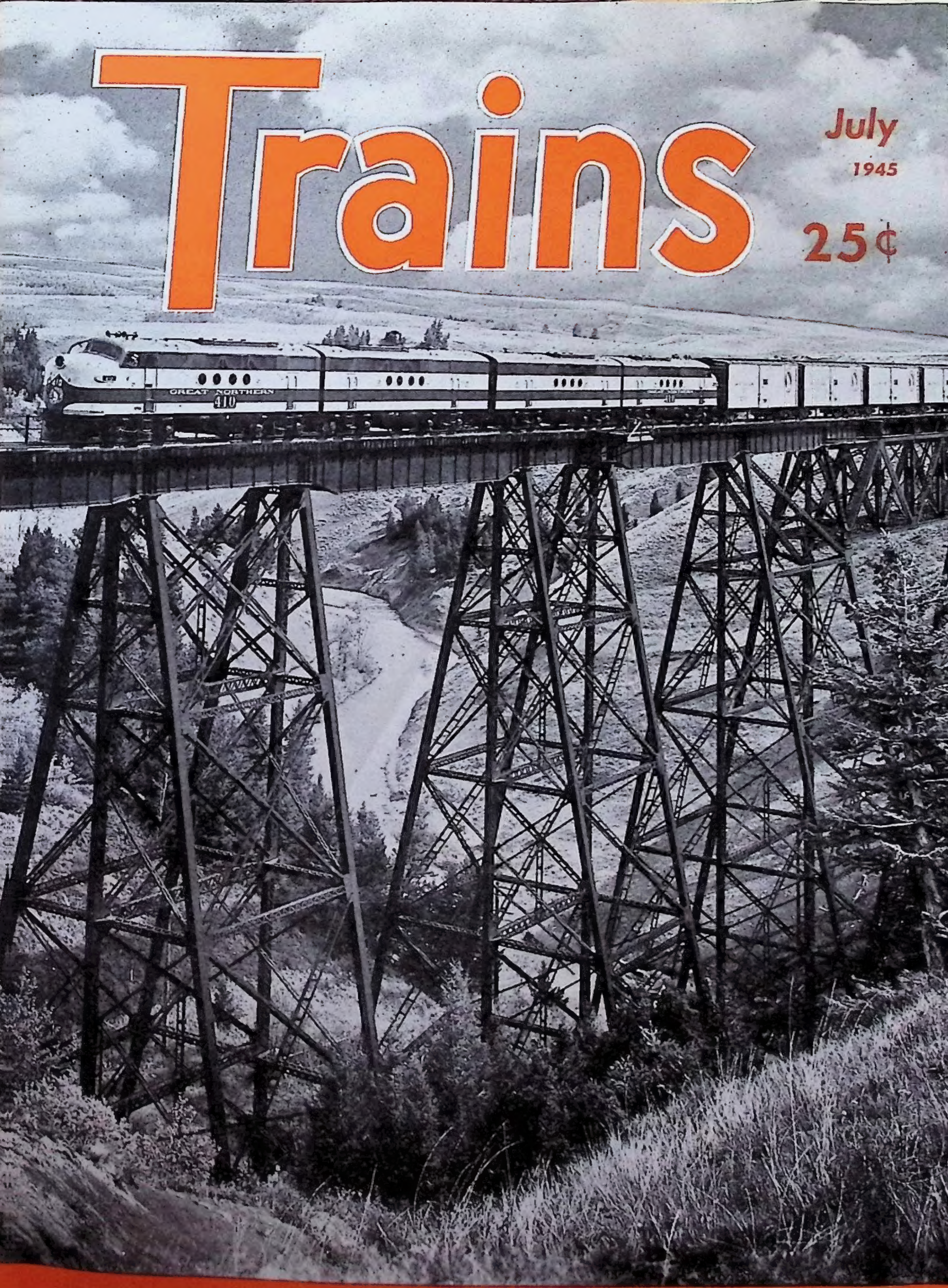

Santa Fe Main Line in Wartime — Page

Why Uncle Sam is ahead more than

6 MILLION DOLLARS A DAY

BALANCE SHEET

In the other World War

The railroads, in 1918, performed 405 billion ton-miles of freight service.

Railroads performed 42 billion miles of passenger service in 1918.

Freight rates were raised about 25%.

The government took over the operation of the railroads.

Deficits resulting from Federal operation cost the taxpayers 2 million dollars a day.

In this World War

The railroads, in 1943, performed 727 billion ton-miles of freight service, 737 billion in 1944.

Railroads performed 87 billion miles of passenger service in 1943 and 95 billion in 1944.

Freight rates remain substantially the same as they were prior to the war.

The railroads have remained under their own management.

The railroads are paying Federal taxes at the rate of more than 4 million dollars a day—to say nothing of their state and local taxes.

BUY MORE WAR BONDS

ASSOCIATION OF
AMERICAN RAILROADS
All United for Victory

Which one will be out of sight first?

A FEW years back, you would have said: "The passenger train, of course!" And you would have been right. For until recently, freight and passenger locomotives were built differently—one primarily for hauling power, the other primarily for speed.

Today, however, there's no telling which one may be out of sight first. For out of American Locomotive's hundred years of railroading experience has come an important development. Locomotives are now being built that are *interchangeable*—that can haul fast freights one day, crack passenger trains the next and do a bang-up job on both. And they may be Diesel-electric or steam or any modification of either type. It doesn't matter whether they use oil or coal—the important thing is economy of performance.

This development helps reduce the number of locomotives a railroad must buy and maintain in order to do its job. And that's important to you. For the more money a railroad can save, the more money it has with which to improve its service.

This is just one of many developments that will contribute to finer postwar railroading. And it is significant that it comes from the Company th gave America its first Diesel-elect locomotive, built the world's larg steam locomotive and has supplied important share of the locomoti now being used for war purposes by United Nations.

American Locomotive

Alco

THE MARK OF MODERN LOCOMO

Trains

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ANNUAL SUBSCRIPTION, DIRECT BY MAIL, $2.50
in U. S. A., Central, and South America; $3.00 elsewhere.

Entered as second-class matter Oct. 11, 1940, at the post-office at Milwaukee, Wis., under the Act of March 3, 1879.

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PUBLISHED MONTHLY BY KALMBACH PUBLISHING CO.
1027 N. 7th St. Milwaukee 3, Wis., U. S. A.

American railroads produce the world's most efficient common-carrier mass transportation and are the foundation of our country's industrial productivity.

TRANSPORTATION is the life blood of our economy. It is as essential to the country as steel, or wheat, or coal. And it is not only transportation which is essential, but efficient transportation. It takes more than refrigerator cars to move California oranges to the East. It takes low rates. It takes more than automobile cars to move Detroit automobiles all over the country. It takes low rates.

Thus the overall efficiency and economy of our transportation is a matter of national concern, and every one of us owes it to his country to do all he can to urge the adoption of sound government policies affecting transportation. The more efficiently we produce our transportation the better off we all will be.

Because the service rendered by various methods of transport varies greatly and because the demands of shippers vary both with the commodity and the circumstances it is impossible to say that any one method of transport is best or all essential. Nothing can equal the airplane for carrying across the continent a replacement part for a valuable machine which has broken down. Cost of transportation is nothing as compared with the loss in keeping the machine idle. No other method can compare with the huge Great Lakes ore boats for carrying iron ore from the head of the lakes to Erie and Ashtabula. Time is of little importance and economy on this great natural waterway is almost without equal.

As long as rates reflect the true total cost of transportation the law of supply and demand balances all the advantages and disadvantages of each method of transport in the shipper's mind and he ships the most efficient way, everything considered. But when taxpayers pay part of the bill for some means of transport the shipper has no way of knowing which method of shipping is really best. He will often ship by the most expensive way just because it looks less expensive from a rate standpoint. The taxpayers pay the rest of the bill, and our national transport bill goes up.

Typical case is the New York State Barge Canal. In 1940 the taxpayers of New York contributed $2.21 per ton, largely for interest and maintenance expenses, toward the actual cost of moving freight on the canal. In addition, of course, the shipper paid some of the more direct costs of operating the barge service. In the same year the average revenue per ton on the New York Central Railroad, serving the same territory, was $1.78 per ton. New York State could have shipped all the canal freight over the New York Central at no cost to the shippers while paying the New York Central regular rates, and still have come out 43 cents a ton ahead. In addition is the fact that most canal freight would have moved on the railroad at rates lower than average.

True transportation coordination will come only from placing all rates on a basis to cover all costs, and then letting the shipper choose which method best serves his needs.

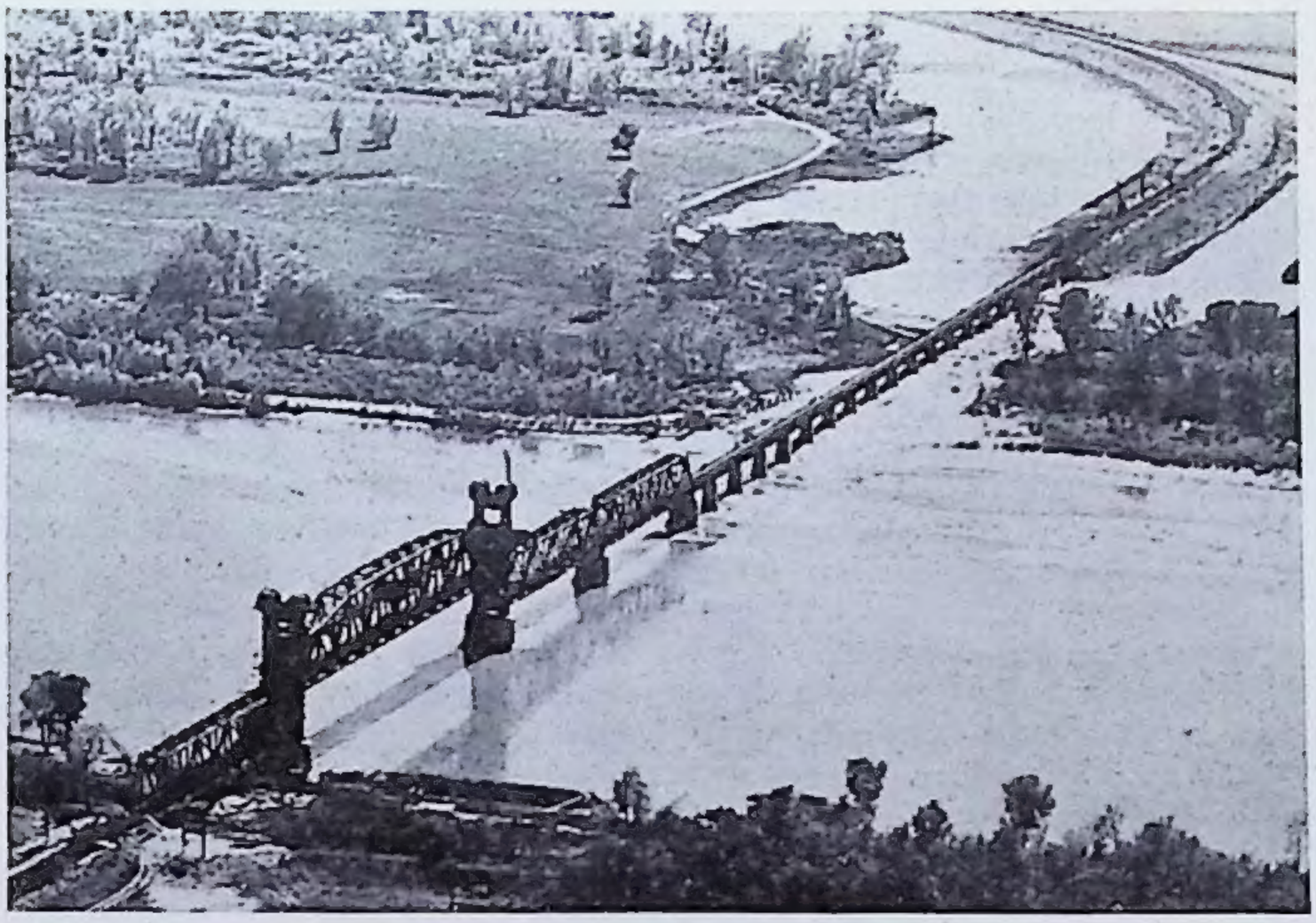
Southern Rate Decision

The Interstate Commerce Commission's decision on Southern freight rates is one of the most important it has ever issued. Part of the decision ordered for nation-wide use a uniform freight classification, based on the present Official or Eastern classification. Another part of the decision ordered that "class" freight rates in all territories except Mountain-Pacific be put on an equal basis with respect to mileage. The uniform freight classification would classify an article under the same rate level in any rate territory, whereas at present each territory has its own classification with some variations. The uniformity in class rates, which apply to only a very small proportion of traffic, means a reduction of these rates in the South and West and an increase in the East.

Because detailed revision of rates, to be made on a basis of about 110 per cent of present Eastern rates, will take years, an immediate increase of Eastern rates by 10 per cent and a decrease of Southern and Western rates by 10 per cent was ordered. In the country as a whole only 4.1 per cent of total tonnage moves on the class rates to which the decision applies, and in the South even less, about 1.8 per cent. The estimated reduction in Southern freight is $8 million annually, while the Eastern increase will be $18 million.

The decision might have been foreseen in earlier I. C. C. decisions regarding Southern class rates, which were once in a very chaotic state. The uniform classification, and the greater uniformity of class rates throughout the country is no doubt a step which was coming sooner or later because of the greater national character our business has assumed. The I. C. C. was fair to the railroads in recognizing their need for revenue and in setting up the rate equality by raising Eastern rates and reducing Southern rates rather than by lowering Southern rates all the way.

Southern politicians and press no doubt hurried the decision by their pressure, and this has caused criticism of "political rate making." Without question the South got exactly what it demanded, uniformity of class rates with the East, but whether this turns out to be the panecea the politicians have claimed it to be remains to be seen. The I. C. C. decision has been widely hailed as the beginning of a new industrialization for the South. And yet it may have exactly the opposite affect. The class rates, which are what you or I would pay if we shipped an icebox to Aunt Susie, are most easily compared and so were the basis of political attack. But they are not the rates under which the



The Milwaukee Road and the Rock Island have started using their new $3 million bridge across the Missouri River northeast of Kansas City, and have named it the President Harry S. Truman Bridge with the permission of the president from Kansas City. The Milwaukee is now able to run its largest power into Kansas City and the Rock Island can run its trains through the city instead of backing into the station. Already one hour has been cut from the schedule of the Rock Island's Golden State Limited.

bulk of industrial freight is shipped.

Once an industry is established, or in process of negotiation, at a definite location the railroads and the industry work out "exception" or "commodity" rates which lift the shipments of that industry from the class rate book and give them a preferred status intended to encourage volume. Naturally railroads wish to encourage industry on their lines. But the class rate levels have little if anything to do with this encouragement. Because Southern roads have had more of a problem in getting new industry into their section of the country Southern tariffs include many more "exception" and "commodity" rates, and the class rates mean very little to Southern industry. But the reduction in them will mean loss of revenue which the Southern railroads must recoup from someone at sometime, for they are not the wealthiest roads in the country. This presumably will mean less liberality with the very "exception" and "commodity" rates which have stimulated Southern industry, while at the same time the wealthier Eastern roads, with their $18 million increase in class rate revenue, will be able to do more than they previously have with exceptions and commodity rates.

Small business in the South will benefit, for in most cases it ships in small quantities and uses the ordinary class rates. But to small business freight is an almost negligible expense. Big business on the contrary will look more askance at the now-favorable Southern exception and commodity rates, which may no longer stay as favorable to the South. Just how this will work out remains to be seen as specific revisions are announced and as their effect on railroad revenue becomes felt. It must not be forgotten that a railroad needs a certain total revenue to stay in business.

The competitive effect is another result of the decision which will be watched with interest, especially in the East. The class rates apply on practically all less-than-carload freight, the type which has been most subject to truck competition.

Odds and Ends

The Seattle-Portland line of Northern Pacific has been extensively improved with heavier rail and maximum curvature of three degrees. . . Average passenger traffic in Great Britain is eight times as dense as in the U. S., and the average fare is 30 per cent lower. . . . You never know what locomotives you will see where these days. The other day Jersey Central Pacific No. 834 was pulling B&O No. 1 into Philadelphia and a week later CNJ No. 851 was on a freight on the B&O's Old Main Line. . . . The Illinois Central is building the first all-electric dining car kitchen on any American steam railroad (electric lines have previously used electric kitchens).

The Rock Island has replaced its *Rockets* between Kansas City and Oklahoma City with the Texas *Rockets* which operate between Kansas City and Dallas-Fort Worth via Oklahoma City on daytime schedules. This run is also served by the Twin Star *Rockets*. [January 1945 TRAINS] on overnight schedules. . . . The Nickel Plate will

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spend $1,600,000 for improvements at Bellevue, O., including a new roundhouse, shop, boiler house, and a relocation of the westbound yard. . . . Brazil and Bolivia are pushing engineering and construction on the final links of an ocean-to-ocean railroad which will open up vast oil reserves for joint exploitation by both countries.

1944 Capital Expenditures

Railroad capital expenditures during 1944 were the largest since 1930, totaling $560,112,000. This was an increase of more than $105 million over 1943. Of the 1944 expenditures, $328 million were for locomotives, freight train and passenger train cars, and other equipment, and $231 million were for roadway and structures. Largest single amount was $178 million for locomotives. For passenger train cars the amount was less than two million dollars, the smallest since 1922, the first year such reports were filed.

Budd Postwar Plans

The Edward G. Budd Company will build a complete range of stainless steel passenger cars as soon as manpower and materials are available, Mr. Budd has announced. Several types of sleeping cars will be in the line, as well as sleeper-coaches, dining, lounge, tavern, observation and head end cars. Special attention will be given to developing cars providing low cost bedroom service.

Airline Fares Cut

A recent cut in airline fares puts air travel in many cases below the cost of first class rail. For instance, the Chicago-Washington fare by air is now $29.45, while rail fare is $31.70 including lower berth. The air lines give free meals while aloft and offer 19 daily flights, doubling the combined train service of Pennsy and B&O. It becomes more apparent that rail fares are due for a lowering as soon as it can be done without overburdening equipment.

Salesman Prefers the Coaches

Book salesmen, who travel thousands of miles a year calling on customers, were recently questioned by *Publishers' Weekly* as to whether traveling conditions were getting worse or better. Answers were detailed in many cases, some stating conditions were improving, others believing that travel was getting worse. Wade Poling, who travels for the Dietz Press, says that with reservations so uncertain he now resorts to unusual liberality with the few remaining red caps to get good seats in day coaches. "There are several good features about riding in the day coach," he says, "You meet more folks, more interesting folks from all stations of life. You see more, feel more, live more, and maybe longer. You ride among good listeners. I have extraordinary opportunities to plug the books of the Dietz Press. I have not yet been able to convince Mr. Dietz, but I believe that a month of day coach travel promoting books is worth a full-page advertisement in any man's newspaper."

NYC's Time Troubles

In planning its New York-Chicago schedules New York Central has trouble with the clock. Westbound trains gain an hour by the difference in time zones while eastbound trains lose an hour. For instance a westbound 14-hour postwar daytime coach train could leave New York at 9 a. m. and arrive Chicago at 10 p. m. But eastbound the departure would have to be 8 a. m. for even an 11 p. m. arrival in New York. Now this is just the wrong way around, for the later departure should be from Chicago to meet western connections. Perhaps the enterprising NYC can find a way to reverse the rotation of the earth.

What's Become of—

The experimental streamlined steam turbo-electric locomotive built by General Electric and used originally on the Union Pacific in 1939 was dismantled in August, 1943. After several months of revenue service on the UP in 1939 the locomotive went back to GE's Erie works for modifications and improvements. Many of the changes were extensive and it was not until January, 1941, that both units were again ready for service. This time they were operated until April on the Adirondack Division of the New York Central, where winter conditions were given intensive study.

By this time industry was well into the war effort and little time and effort could be spared for further improvements and tests, so it was not until 18 months later that both units were again ready for service. This time the steam-electric operated in revenue service on the Great Northern, and from the middle of March until August, 1943, it ran in freight and passenger service between Wenatchee and Spokane, Wash., and between Wenatchee and Havre, Mont. Schedules were met or improved. In August operation was discontinued and the locomotive was returned to GE. Improved design and modification to incorporate experience would have required rebuilding from the rails up, and this was impossible because of the war. The locomotive was, therefore, dismantled.

Uphill to Clinton Junction

The four-unit Diesel was trembling with exertion and fairly exploding with the roar as she accelerated the 4200 trailing tons up the grade out of the Rock River Valley at Beloit. In the cab was a young reporter, invited along to witness train-communication tests.

The reporter was obviously thrilled by the thousands of horsepower, by the vibrations and sound of accomplishment, and by the engineer carefully hoarding his throttle positions as nearly a mile of train slowly picked up speed. But after 15 minutes or so of careful watching, he looked at the speedometer and asked the engineer, "Is 35 the fastest this boat goes?"

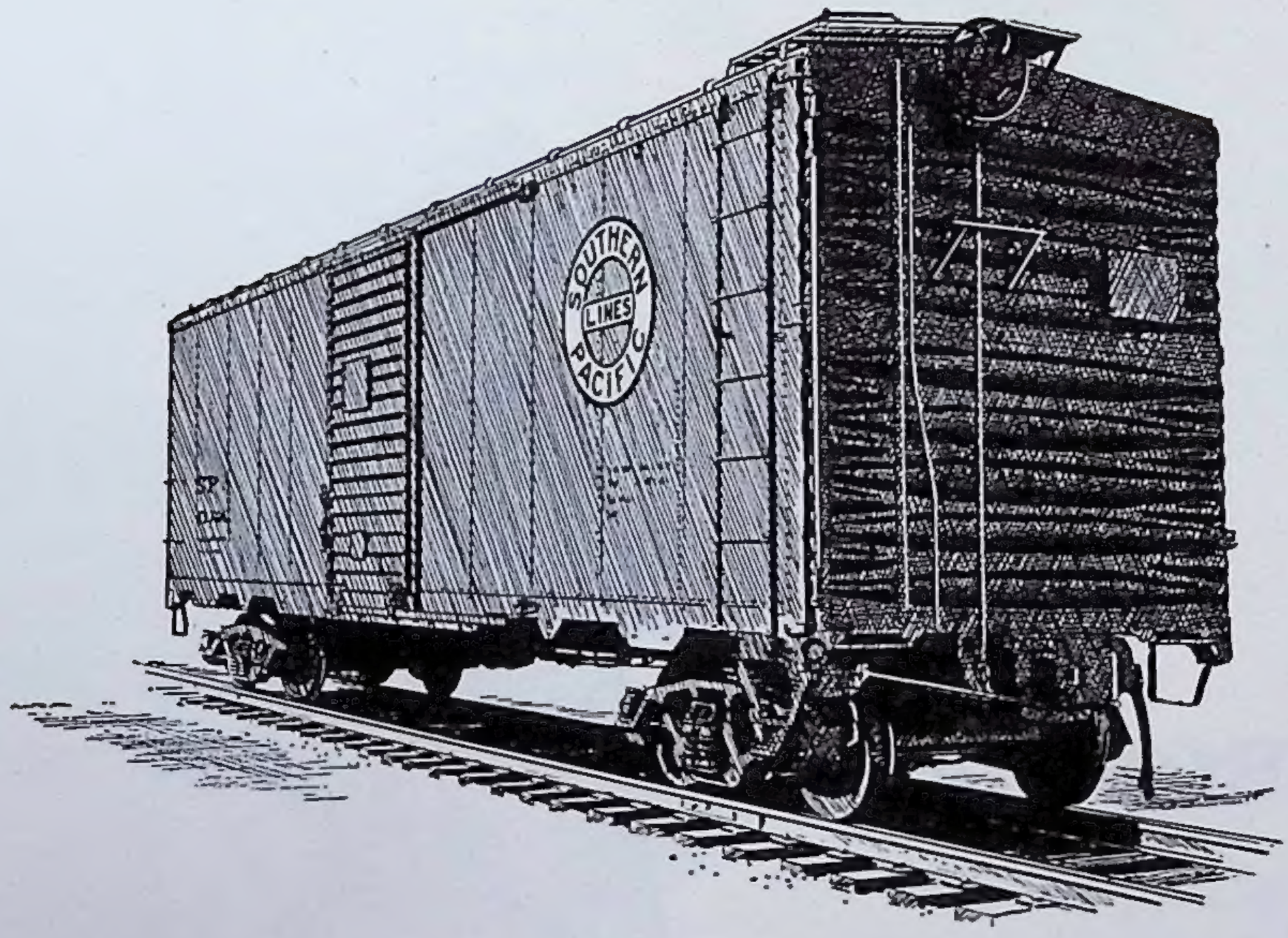
"Wait till we get over the crest of the hill at Clinton Junction. Some of this is one per cent grade and it takes plenty of power to get 4200 tons of train going, especially on upgrade."

"By golly," exclaimed the reporter, looking again at the apparently level track ahead, "the folks in Beloit will sure be surprised to hear that it's uphill to Clinton Junction!"

The crest at Clinton Junction was plainly evident, and as the Diesel dropped over the top the reporter's eyes never left the speedometer. Nothing happened —at once—so he challenged the engineer, "I thought we'd get going after we passed Junction?"

"Son," came back the engineer, "this ain't an automobile. We may be going downhill, but there's still half a mile of our train coming uphill."

A. C. Kalmbach.



Meet the "workhorse" of the railroads

Not glamorous, not a "show-off"—the unpretentious box car. You never see it bristling with amtracs, Higgins boats, 10-ton trucks and jeeps, like the flat cars and gondolas. It's just a modest workhorse—doing one of the biggest war transportation jobs of all.

These plain, unassuming cars are carrying the war to Japan—carrying airplane engines, parts to outfit ships, medical supplies, millions of tons of foodstuffs and ammunition and small arms.

For nearly all war cargo that goes to sea, goes by rail first. And this huge transportation job is just as important as fast production in war factories.

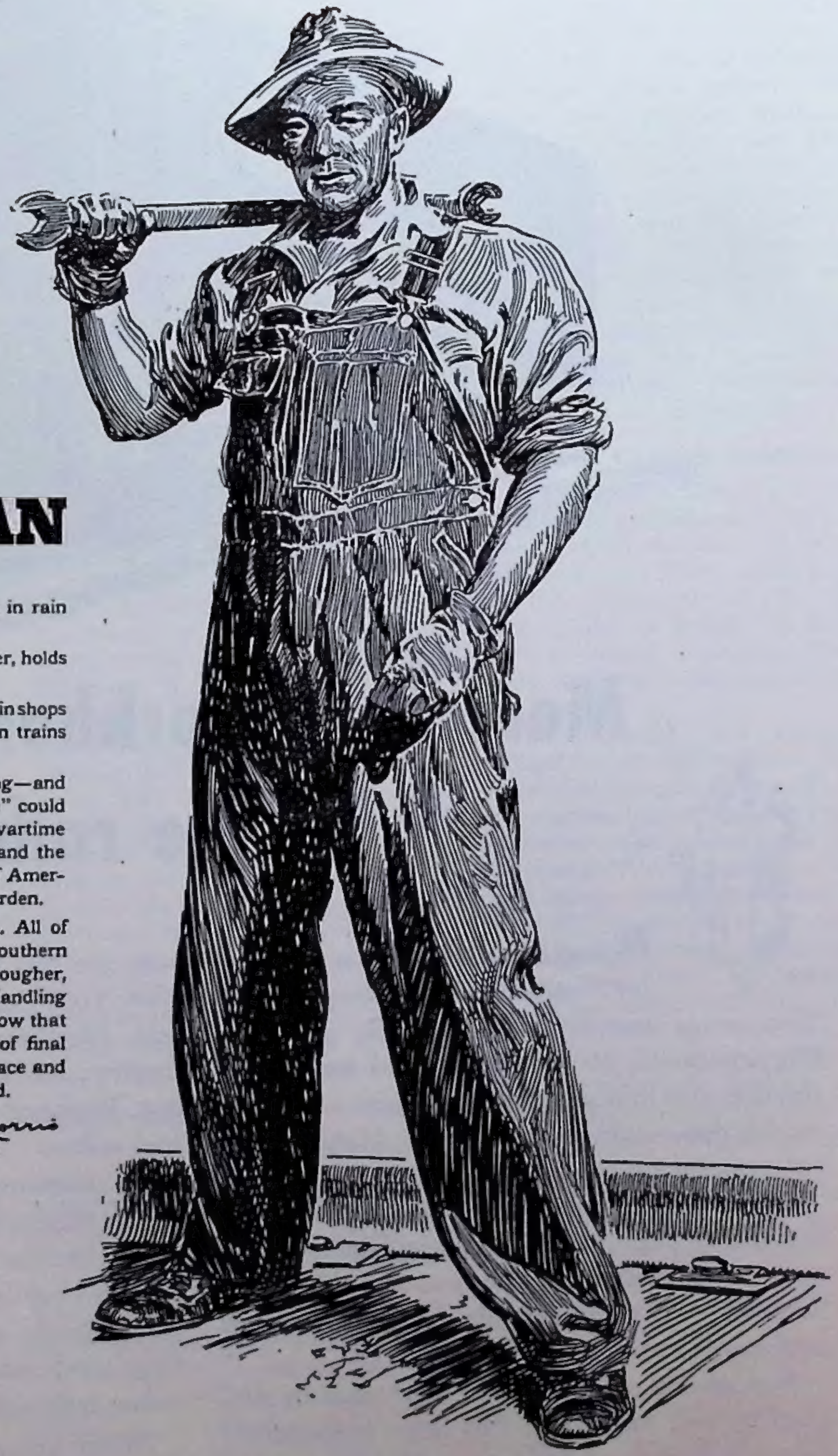
The humble box car best symbolizes the fact that transportation is the job of all railroads working closely together—pooling resources and exchanging equipment and facilities.

That is why you see on Southern Pacific rails the box cars of nearly every railroad—New York Central, Erie, L & N, Illinois Central, Northern Pacific, Union Pacific, Burlington, Rock Island, Pennsylvania, Southern, Western Pacific, and Santa Fe to name just a few.

As pressure on Japan increases, you will see an increasing number of war freights rolling on Southern Pacific's 15,000 miles of line. That's because S. P. serves the major West Coast ports of embarkation and more military and naval establishments than any other railroad.

When you see these freight cars, representing almost every railroad, let it remind you how all railroads are working closely together to deliver the stuff our fighting men need—on time!

S·P **The friendly Southern Pacific**



IRON MAN

You'll see him along the track in rain and heat and cold.

His strong hand wields a hammer, holds the throttle, waves a lantern.

He's "workin' on the railroad"... in shops and yards and roundhouses . . . on trains and in stations and offices.

He's the "iron man" of railroading—and without his help, the "iron horse" could never have hauled its record wartime loads. Together, the iron horse and the iron man took on a major share of America's emergency transportation burden.

They're seeing it through, too. All of the 50,000 men and women of the Southern Railway System are handling tougher, heavier jobs than ever before. Handling them cheerfully—because they know that their work helps speed the day of final Victory, and the coming era of peace and prosperity for the whole Southland.

Ernest E. Norris
President

SOUTHERN RAILWAY SYSTEM

H. Sullivan, Placentia, Calif.

The Grand Canyon Limited, double-headed by a 4-8-4 and a 2-10-2, blasts through Cajon Pass.

Santa Fe Main Line in Wartime

Westbound freight on the Santa Fe moves in record time over extensive line improvements

BY HENRY D. RENNWALD

On a clear, cold, mid-December night, conductor Ed Parry walked into the Santa Fe office at West Winslow, Ariz. Chatting for a moment with second-trick operator Dorothy Schroeder, he picked up his train orders and clearance card, climbed into the cab of the big Diesel locomotive, and read them over with engineer Frank Merrifield. After comparing watches, Parry left the engine and started walking back to the caboose. Merrifield handed the orders to fireman Bob Abel for his information, whistled off, and Extra 118 west rolled slowly off the lead and out onto the main, bound for the Pacific Coast with 54 cars and 3400 tons of wartime freight.

Scenes similar to this take place throughout the day and night at West Winslow, as train after train moves through Winslow, headquarters of the Albuquerque Division of the Santa Fe. Traffic on this line is up approximately 175 per cent from January, 1942.

The main line of the Albuquerque Division extends 429 miles from Albuquerque, N. M., to Seligman, Ariz. It also includes two branches—one of 194 miles from Ash Fork to Phoenix, and another of 64 miles from Williams to the Grand Canyon. Superintendent of the division is A. B. Enderle, who has 4356 employees under his jurisdiction. Of the 1078 persons employed in the maintenance of way department, the majority are Navajo Indians, with a sprinkling of Mexican Nationals, working under contract with the Mexican government and the railroad during the wartime emergency.

Winslow during the past four years has become one of the most important points on the railroad. It is here that all through westbound freight changes over from steam to Diesel. The

Highlights of Santa Fe Improvement Program Since January 1, 1942

1. Purchase of additional Diesel-electric locomotives so that its Diesel fleet now consists of 15 passenger, 68 freight and 123 switch engines—a total of 524,960 horsepower, the largest of any railroad. Complete Dieselization for freight service of line (459 miles) from Winslow, Ariz., to Barstow, Calif.

2. Construction of new Diesel shops and repair facilities at Winslow, Ariz., and Barstow, Calif.

3. Construction of new bridge across Colorado River near Topock, Ariz.

4. Acquistion of 30 Northern type and 25 Santa Fe type steam locomotives which have been added to its already large fleet of steam power.

5. Santa Fe track work during the past two years and at the present time, in addition to normal maintenance, has been geared to producing a railroad with a potential speed capacity of better than 100 miles per hour by the reduction of curves and grades, the laying of heavier rail, and the insertion of new ties. New rail being put into its main line is 131-pound steel. An average of more than 2,000,000 new ties per year have been inserted during the past three years.

6. Extension of relocation of existing sidings and passing tracks at 246 locations, involving a total of 128 miles of new sidings and passing tracks, and the laying of 81 miles of new double track at strategic locations, making a total of 209 miles of new track since January 1, 1942.

7. Enlargement and extension of yards at 24 important terminals, and, at eight of these terminals, the building of new heading-out and auxiliary tracks.

8. Installation, since January 1, 1942, of 346 miles of centralized traffic control.

9. Enlargement and improvement of its communications system to the point where it now has the largest private communication system in the world.

run from here over Albuquerque and Arizona divisions to Needles and Bakersfield, Calif., is handled by 5400-horsepower four-unit locomotives. At present 68 of these are in service and 17 more are on order from the Electro-Motive Corporation.

During the month of November, 1944, a total of 3258 cars was the daily average freight load moving into California. Of this load the Santa Fe handled a daily average of 1068 cars—one third of all the freight moving to the coast. All this traffic moved through Winslow. On one of two days picked at random during November, the figures for Winslow showed that 1127 loads went west, along with 42 empties. The second figure shows 1644 loads moved westbound, and 39 empties. The traffic in 1942 showed an average movement of 511 loads westbound. In 1943 this average had risen to 684 cars, and for 1944 up to, but not including, November, 877 cars was the daily loaded average west out of Winslow. With the heavy traffic of November and December, the daily average for the entire year 1944 ran more than 1100 cars per day. The movement eastbound is almost as heavy, so far as cars are concerned, but a big portion of the movement is made up of empties going back to their home roads.

During the season when the citrus crop is rolling, the division gets really busy. Solid trains of fruit move from the productive groves of California toward eastern markets starting early in February.

Barstow, Calif., is another important division point on the Santa Fe. Here the westbound freight is split up—about 40 per cent going up to the north over the Tehachapis to Fresno, Oakland and San Francisco, while the

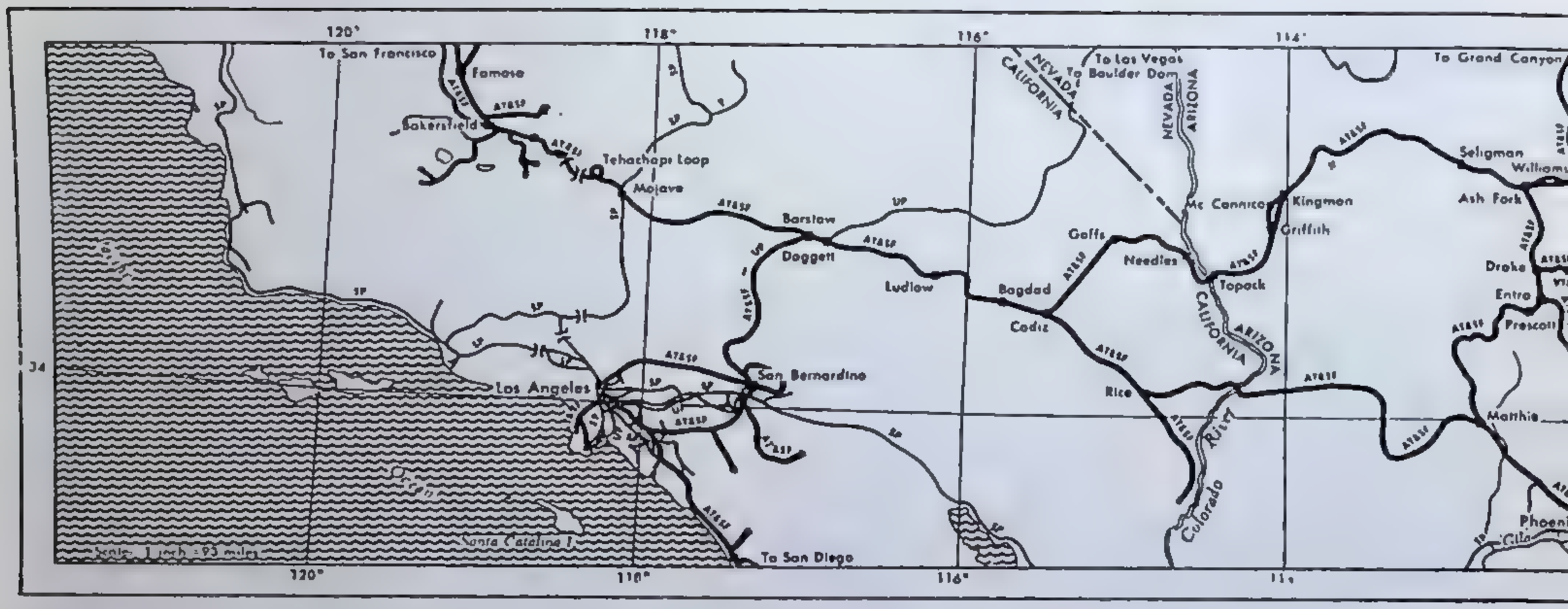
Courtesy Santa Fe.

Capable of accomodating 2640 cars, Barstow Yard in the Mojave Desert is an important operating point where Santa Fe lines from the east diverge to Northern and Southern California. In addition to Santa Fe traffic, Barstow accomodates Union Pacific's Southern California business on joint trackage.

remainder continues south through Cajon Pass to San Bernardino, Los Angeles, and San Diego. Some of the eastbound fruit tonnage comes from Pomona, Upland and points in Southern California, while grapes and potatoes originate on the northern line around Bakersfield, Famosa and Fresno. All comes into Winslow—on east to Belen, and then is diverted toward Texas points, or into Kansas City and eastern terminals. Most of the freight on the Santa Fe moves east of Winslow on the southern main line, the so-called Belen cutoff, into Kansas City, thus avoiding two stiff passes—Glorieta and Raton—in New Mexico. Via Belen the grade is less rugged, a maximum of 1.25 per cent as against a stiff 3.5 per cent on Raton Pass, the route of the principal passenger trains.

The average grade westbound out of Winslow is 1.4 per cent. The toughest portion is a westbound down grade from Ash Fork to Supai, a distance of 20 miles where the descent runs as high as three per cent.

While the entire Santa Fe line from Dalies, junction of the two main lines 10 miles west of Albuquerque, to Barstow is double tracked, there are certain points along the route where the east and west main are as much as three miles apart. Supai Hill is one example. After leaving Supai, the line divides, and the two tracks do not come together again until just before Ash Fork is reached. It was found, at the time the company decided to double track



Santa Fe's extensive improvements are making the western end of the system into a veritable super-railroad.

the road, an easier grade could be put in, eastbound, to the north of the original main line. So at all points where grades were encountered, the line of least resistance was followed. The same holds true on the Arizona Division between Needles and Barstow. At times a westbound train will travel for over an hour before meeting the eastbound rails.

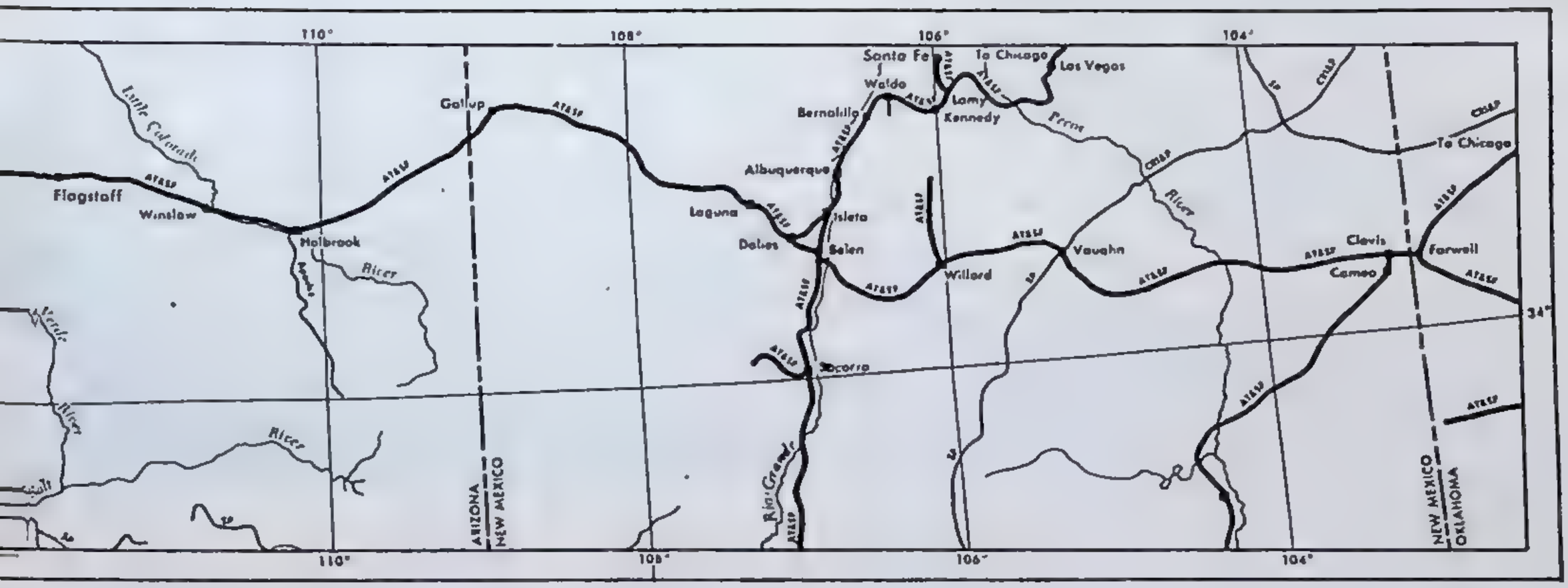
The yards at Winslow, consisting of 33 tracks, have a capacity of 1600 cars. While not too much switching is required at this point, the yards at times are well populated with through trains. On a recent Monday night, between 6 and 6:30 p. m., four freight trains came in from the east, were inspected and serviced, engines changed, and by 8 o'clock the first of the parade was on the way west.

In order to care for the heavy traffic passing through, Winslow has a huge roundhouse and shop facilities. The roundhouse is divided into two parts, one portion being used for steam engines, with the rest housing the Diesels. An asbestos fireproof wall separates the two units. There are 27 stalls for the steamers, and 14 stalls for the blue and yellow Diesel jobs.

The overall length of a four-unit Diesel is 194 feet, 4 inches. On the outside of the roundhouse are three tracks capable of handling the complete locomotives. Pits with lights for night work are under these tracks. Then come three tracks without pits, each of which will handle a two-unit job. And inside the house itself are eight stalls with pits which also handle two-unit locomotives. Thus the 14 stalls devoted to the servicing and maintenance of Diesel power can handle a total of 34 units. The roundhouse was remodeled when the Diesels moved in, and in fact, work is still going on to make servicing more convenient. For example, the floors alongside the pits inside the house were built up to cab level. This was done to make the motor compartments of the units readily available to the men working on the locomotives between runs. A Diesel can arrive in the house with a bad motor. The body will be jacked up, bad motor taken out, new motor put in, and the engine readied for the road inside of three hours. The bad motor is then taken to the shop, repaired, and stored in the store room until it becomes necessary to replace another motor on a different engine. The same holds true with all parts that are reported in bad order. Instead of holding the unit in the shop until the defect is repaired, the part is simply taken out and replaced.

Another factor enabling the road to move the heavy tonnage with a minimum of delay is the availability of the Diesel. These run 2000 miles before a complete servicing is necessary—two round trips from Winslow to Barstow. Usually, within two hours after arriving at either of the terminals, the engine is ready to go back on the road again.

The Diesel carries 4800 gallons of Diesel oil (25 of latest locomotives built carry 5400 gallons), 580 gallons of lubricating oil, 980 gallons of cooling water. This is enough for a run from Winslow to Barstow, with a good margin of safety. However, should something develop to cause excess use of oil, facilities are maintained at Seligman and Needles to replenish the supply. A new distilling plant has been constructed at Winslow to handle the water supply for the Diesels. The plant is completely automati-



All heavy lines represent AT&SF track.

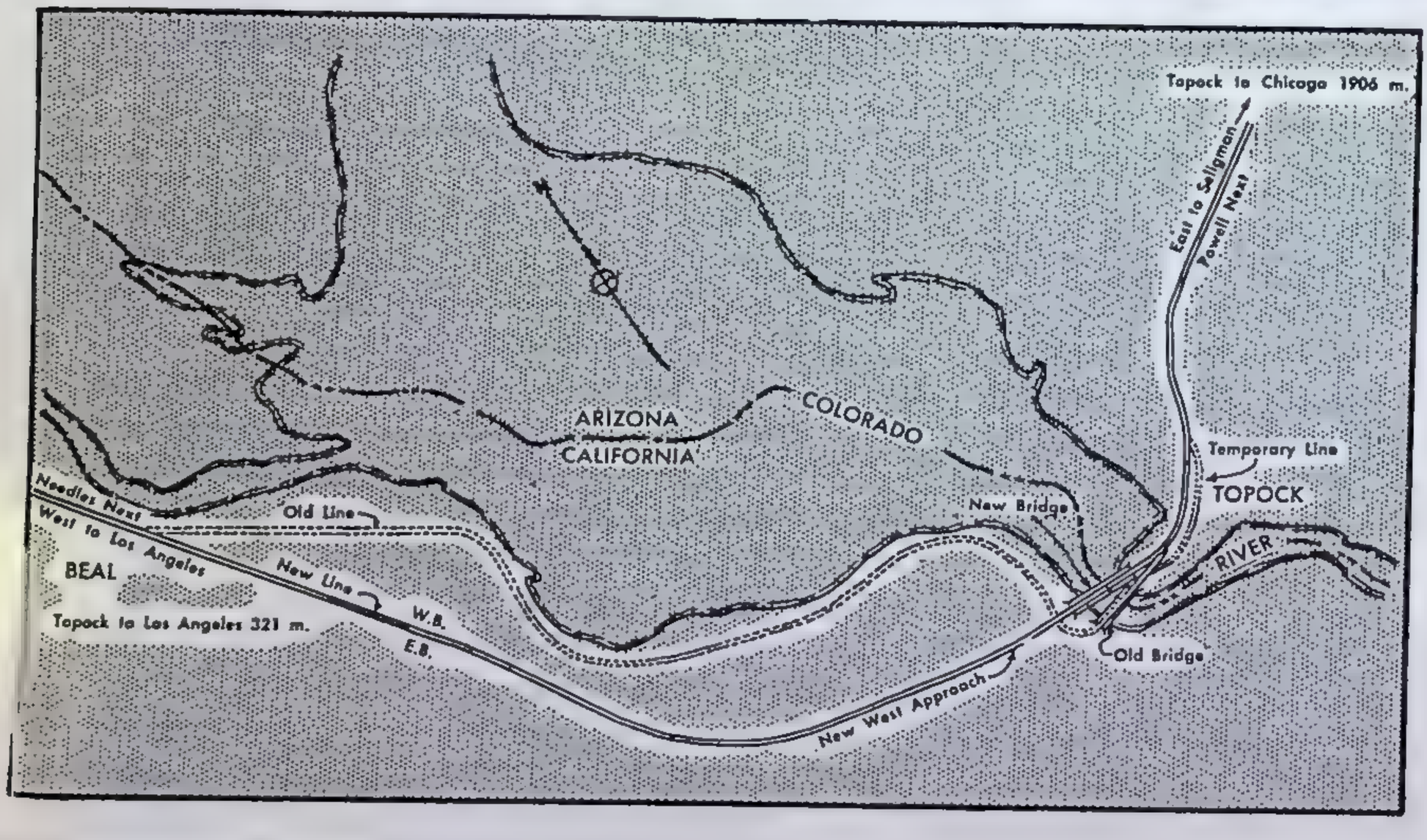
uses steam from the roundhouse, and has a capacity of 23,000 to 25,000 gallons of water daily.

Since the Albuquerque and Arizona divisions traverse both mountainous and desert territory, maintaining a water supply along the line was always an important item. In the desert, in addition to supplying water for the locomotives, it was necessary to bring in drinking water. Two years ago, the road hauled 1,250,000 gallons of water each day to care for engines, drinking, etc. When the divisions were Dieselized in so far as freight traffic was concerned this was cut to 200,000 gallons a day. Today only passenger trains and local freight service use steam engines, and the Diesels get their meager water supply at Winslow and Barstow. There is a real saving of transportation in this reduction of water consumption.

The territory over which the Diesels operate has the appearance, on a profile map of the Santa Fe, of a roller coaster. The altitude at Winslow is 4856 feet. At Riordan, the elevation is 7250 feet. Then the line drops down to 5143 at Ash Fork, climbs gradually to 5242 feet at Seligman where there is a long westbound descent to 483 feet at Needles, the Colorado River crossing. Immediately upon leaving Needles, the line starts a 32-mile climb to Goffs, where an elevation of 2585 feet is reached. Another drop follows into Cadiz, at 789 feet, and another climb to 2106 feet at Barstow. In order to handle the trains safely down these various grades, dynamic braking is used on all Diesel freight locomotives. This operates on the same principle as running an automobile motor in second gear while descending a hill—the compression of the motor acting as an auxiliary brake. The electric traction motors, reversed, act as generators, dissipating their load through resistance grids. With the use of the dynamic brake, a big saving in damage to overheated car wheels was effected, and much time was saved by eliminating the stops to cool wheels while using the conventional brake on a long descent. Retainers, of course, are still used, but the dynamic brake gives the engineer firmer control over his train, and lessens the always present menace of a train getting out of control while descending a steep grade.

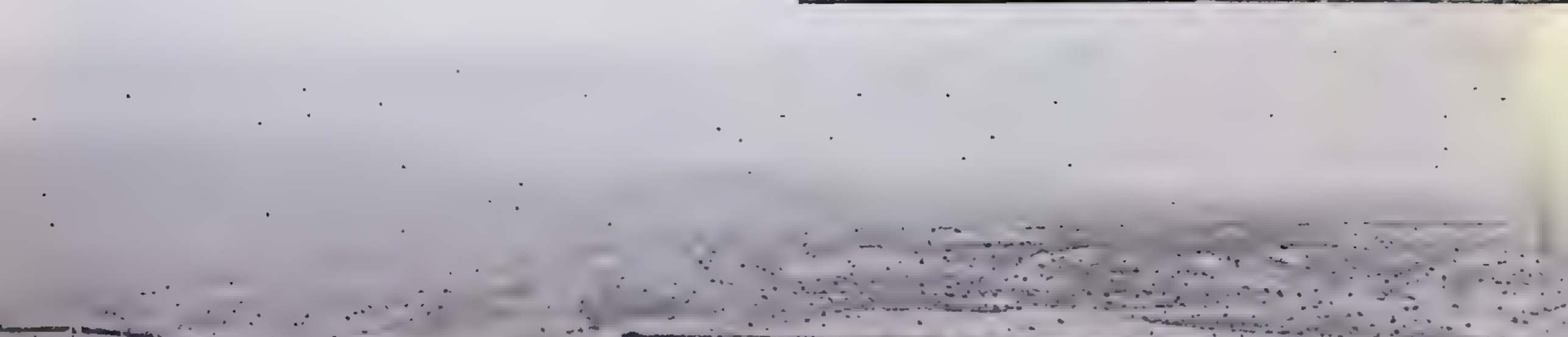
While the Diesel power is doing a grand job of moving the wartime freight on the Santa Fe, the men on the line are also doing yeoman service. Under ordinary circumstances, the men in engine and train service are limited to making 3800 miles a month. Now, however, due to the steady flow of commerce, the train service employees are putting in as many as 5700 miles a month. Since an average of between 17 and 25 freight trains a day move westbound out of Winslow, each train requiring a crew of at least five men, it can readily be seen how many men are required to handle the business. But as in all other industries, the manpower supply on the railroad is at low ebb, with 11,000 Santa Fe employees in the armed forces. Consequently the men remaining on the job must double up. The freight division from Winslow to Seligman is 142 miles. Thus, in turning in 5700 miles a month, a crewman will make 20 round trips instead of the regular 13 round trips when traffic is normal. Eastbound, from Winslow to Gallup on the other end of the division, the distance is 128 miles. Trainmen on this run make 21 round trips. However, since train

All illustrations courtesy Santa Fe.



Various stages in the construction of the third bridge built by Santa Fe across the Colorado River on its line between Topock, Ariz., and Needles, Calif. Photo at upper left, taken from the California side of the Colorado, shows start of piers for the new bridge. The old cantilever type Red Rock bridge, which crosses the river at

a wider point and was frequently the scene of washouts, will be converted for highway use. In next photo hammerhead crane lifts buckets of cement during construction of piers. As can be seen from the map, the new line has been located far enough from the river to eliminate flood hazards. Above: Temporary steel bents support deck truss during building of the new bridge. Crane is placing chord between second and third piers. Right: Erection of steel spans as seen from the Arizona side of the Colorado. Approximately 90 per cent of the construction was completed when this photo was taken. Total length of the span is over 1500 feet. Below: The completed Topock-Needles bridge in use showing the old line in the foreground. Work on the substructure was begun in November, 1942, erection of the bridge started in May, 1944, and the first passenger train crossed the completed bridge in February, 1945.



Since 1935 68 freight Diesels of 5400-horsepower which are similar to No. 137 have been purchased by the Santa Fe. Ten more soon will go into regular service. All were built at the General Motors Electro-Motive plant.

crews (not engine crews) work both ways out of Winslow, some of the men are putting in a full 30 days' work before getting a day of rest. Engine crews work only one way, running either between Winslow and Gallup or between Winslow and Seligman, but not between all three points as the train crews do. Despite the long hours, the men are not complaining. Engineer Merrifield seems to speak for all railroaders when he says, "I figure the more stuff we get over there, the quicker it will be over and my boy will be home again." And since a vast majority of the employees have sons, brothers, or other relatives in the armed forces, they do their part as "soldiers on the home front" to supply the soldiers overseas with equipment.

LET'S take a trip on Extra 118 west, and see how the Santa Fe is doing its part in moving the freight to the coast. After the orders are delivered to engineer Merrifield, we move up to the end of the yards at West Winslow, waiting for second 3, the *California Limited,* to pass. Back in the caboose conductor Parry, whose son is a sergeant in the air forces overseas, is already busy on his train book and on getting things squared away for the run to the west end of the division. At 9:10 p. m., second 3 rolls by and head brakeman Harry Samelson opens the switch for us to head out on the main. Rear brakeman Jimmy De Rosa closes it, gives a highball, and Merrifield begins to roll the 118. Merrifield and fireman Abel start figuring where they will go to head in for the *Chief.* They decide to try to make Williams, 92 miles west.

There is a steady climb out of Winslow to Canyon Diablo, but the 118 with its 3400 tons rolls along in fine style. At Moqui, we meet second 24 on the double track steel highway. Approaching Canyon Diablo trestle, the signal indication is yellow. Merrifield explains that the track on the bridge is gantleted, and an eastbound train is in the block. We slow down, and soon the indication goes to green, showing that the eastbound train has cleared the gantlet track. Soon a double-headed Diesel thunders towards us—it is Extra 140 with locos 140 and 137 coupled. This represents 10,800 horsepower, and the two locomotives seem to be pulling all the cars in the state.

But this is merely the first of a long string of trains Extra 118 west meets during the night. Merrifield now shuts off, and drifts onto the Canyon Diablo trestle—a bridge 531 feet long spanning the 222-foot deep canyon. Watchmen are stationed at both ends at all times to guard against any mishaps. Rolling off the trestle we

pick up speed and at 10:35 observe Extra 123 east at Angel. More extras east—No. 110 at Riordan at 12:05 a.m., No. 136 at Nevin, and then just west of Main a rarity, Extra 3853, a steam locomotive. At 12:53 Merrifield brings the train to a stop at Williams. A quick cup of coffee at the Harvey House, and at 1:35 a.m. No. 19 thunders through. Extra 149 east pulls by with 103 cars, and at 1:39 a.m., we are on our way again, just as Extra 147 east comes in to town. Yes, freight really moves on this division!

At Supai, the top of the hill, Merrifield brings the train to a stop and whistles out his flag. Samelson and De Rosa go over the train, bundle up in heavy clothing, set up retainers on 34 cars and prepare to ride the top down the hill. After the inspection, Merrifield calls in flagman Boyd Skinner, gets a highball and starts down the 16-mile hill. Supai is a dandy. It is at this point the east and west mains separate, and we roll down single track, with the dynamic brake in operation. The speed limit on the hill is 15 miles an hour, and the needle on the lighted indicator hovers between 12 and 15. When it gets close to 15, Merrifield makes an application with the air brake, augmenting the dynamic, and the train almost immediately slows.

The temperature at this time is 22 degrees, and Samelson and De Rosa are out in it! Winding around curves, slipping through one short tunnel, still more curves, at 3:24 we're in Ash Fork. It has taken one hour and 32 minutes to come down the mountain. With the retainers back to normal, Merrifield pulls out and heads for home, arriving in the yards at Seligman, end of the division, at 4:45 a.m., Mountain time. The run from Winslow has taken seven hours and 30 minutes.

Setting our watches back one hour to Pacific time, we head into the Harvey House for more coffee, while the new crew takes over and the

Deisel freight pulls into Arizona on left side of approach to new bridge. These old tracks have since been abandoned and all traffic moves over the new bridge at far right. The long fill permits easy grades on the approach on the east bank while the west approach is on naturally high ground.

Courtesy Santa Fe.

Wheel Clicks Collection.

Upgrade to Summit nearly 4000 feet above sea level. Two Santa Fe type locomotives (2-10-2) snake the train through the Cajon Pass.

car inspectors again go over the train. They find one bad order, and send for a switch engine to cut it out while we meet the Arizona Division crew, composed of engineer J. L. Ballard, fireman W. R. Crocker, conductor C. F. Shepherd, and brakemen Smiley, Anderson and Hays. With the bad order out and an air test made, Ballard eases the 118 out of the yards at 4:41 a.m. From here to Needles, the road is a descending grade all the way. At 6:38, first 4, the *California Limited,* hurtles past us on the double track. Ten minutes are required at Walapai for another train inspection.

Just before reaching Kingman we see a beautiful sight. The track curves gracefully to the left, then reverses itself to the right, and enters a stretch 18 miles long without a curve. In this 18-mile stretch, eight green lights can be seen in a row, each one showing the track ahead is clear. With dawn just breaking, and the "emerald necklace" stretched out, it is really one of the prettiest sights on the trip. We get stuck at Kingman station at 7:45 a.m., while waiting for No. 8, the eastbound *Fast Mail,* to load and unload seemingly endless trucks of mail. Kingman is the site of an army camp so the volume of mail handled at that point may well be imagined.

At Yucca we stop another 10 minutes for inspection, with the train in fine shape. At Topock, a flagman waves us down, saying a steel gang is working up ahead, and to proceed with caution. Topock is the last station in Arizona, and at this point another gantlet bridge is encountered, this one spanning the Colorado River, border line between Arizona and the state of California. The steel gang is busy just finishing up a new double track bridge at this point. As Ballard moves slowly up to the gang, we see a long line of trains on the California side of the river. Closer inspection shows there are four freights and second 8 in a line which stretches for several miles. Speculation rises in the cab as all wonder who will get the board first, and hope it will be the 118. It is. The board at the bridge goes green, Ballard calls in the flag and the crew is on the last lap of their run. At 11:02 a.m., the 118 stands "at ease" in the yards at Needles, having made the run from Seligman in six hours and 21 minutes.

Here we lose the train we've hauled from Winslow. Another one is standing on the track next to the inbound where we stopped. The 118 is cut off, run through the switch, and backed on to a new load. Conductor H. H. Hansmire tells us we've got 61 cars this time, and 3239 tons. Fireman Johnny Walters goes into the motor rooms to look over the motors, engineer G. H. Forsyth reads over the orders, and at 11:34 a.m. Extra 118 west heads out of the yards at Needles. The engine was idle at this division point only 32 minutes before getting under way. And out of Needles she really works. The climb takes the train from an altitude of 483 feet at Needles to 2585 feet at Goffs, 32 miles to the west. But the 118 takes the bit in her teeth and rolls the 61 cars along in good shape.

Just as Forsyth has her rolling, we hit a yellow board—and the next one is red. A work train is busy spreading gravel, and we get stabbed eight minutes. Right on the hill, after the work train clears the main, the 118 starts without a quiver—no slack, no jar. She just begins to walk up the hill after the slight pause. The top of the hill is reached at 1:45 p. m., and after the usual inspection, Forsyth begins to "go to town." The hand on the speed indicator stays between 45 and 48 as we speed through the hot California desert. By this time the temperature has reached 85 degrees—in contrast to the 22-degree temperature at Ash Fork. But the Diesel just keeps rolling along. And no stops for water! Another inspection at Cadiz and into the hole at Amboy for first 23.

Soon an ironical touch is given to the desert. In the midst of the wasteland, with heat waves rising in tiny rivulets and the sun beating down unmercifully (and this in December, mind you) we pass in succession Siberia, Klondike and South Klondike! Evidently the person naming these points had tongue in cheek while painting the names.

At Ludlow, while waiting for second 23 to pass, we see two engines of the old Tonopah & Tidewater standing on a side track. Several flat cars of the now extinct road also stand in the yard. The rails of the T&T have been torn up, and it is only a matter of time until the two little locomotives will be headed for the scrap pile also. As the sun slowly disappears, we begin to wonder if Siberia, Klondike and South Klondike weren't named correctly after all, for the atmosphere is now very much on the chilly side. And it gets colder as the sun sinks completely. At Newberry No. 7, the *Fast Mail*, passes us. This is the last passenger train we have to look out for, and the run now to Barstow will be easy. But at Daggett, where the Union Pacific comes in on the Santa Fe, we're delayed by a switching crew. They clear, and we ease into the yards at Barstow at 7:15 p. m., after a run of six hours and 19 minutes from Needles.

As we climb down from the cab and Forsyth moves the 118 toward the house track, the Diesel has been on the road 23 hours, over some of the most gruelling territory on any railroad in the United States. And yet, the possibility is that by midnight she will be headed back to Winslow with another tonnage train. Servicing of the Diesel starts at the washing platform where grease and grit are removed from the running gear with steam jets. During this process, the 1350-gallon fuel tank of each unit is filled and the radiators supplied with distilled water. From here the engine moves to the maintenance house for service and light repairs. In order to conserve time, most parts which need replacement are taken out to be repaired later and a new part substituted.

Traffic up 175 per cent . . . 1068 daily loads into Barstow . . . crews putting in 5700 miles per month . . . engines working 23 hours out of 24 . . . building new bridges without interruption to the flow of traffic . . . all this is taking place on the Santa Fe now. With the war in the Pacific becoming more acute, and the U. S. forces concentrating on that scene of action, what will the next year bring forth? Whatever it may be, the Santa Fe and its employees will do the impossible—and do it well.

Santa Fe Mikado No. 3232 (2-8-2) scurries a heavy war freight west over desert near San Fidel, N. Mex.

Richard H. Jahns, U. S. Dept. of Interior, Pasadena, Calif.

Old Railroad Folders

Timetables in the early days of the railroads combined schedules with colorful pictures and maps

A HIDDEN wealth of interesting information is contained in almost every old timetable and a collection of them will afford many hours of fascinating diversion. The illustrations on these pages were all made from folders in the timetable collection of Edward F. Gardner, Philadelphia.

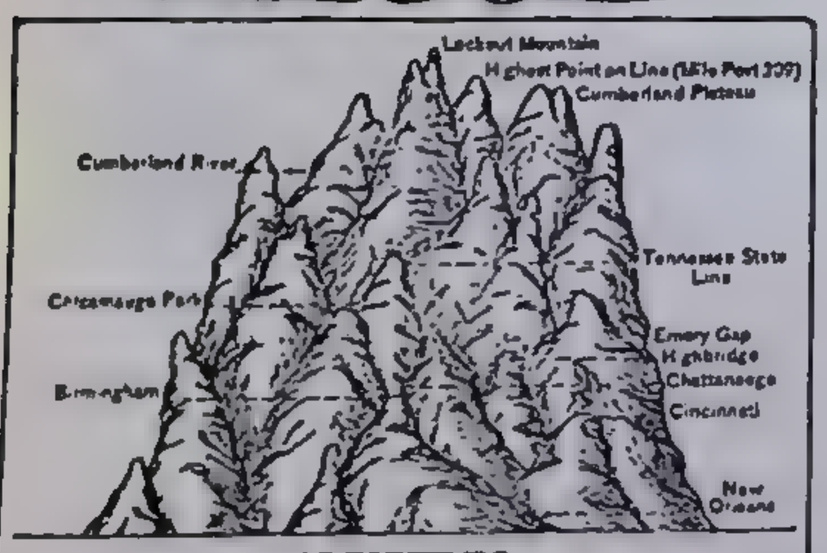
Timetables are the key which can unlock much of railroad history. They show progress, as in the announcement of the use of electric block signals by the Cincinnati, New Orleans & Texas Pacific Railroad in its Queen and Crescent schedule of May, 1907. The amount of emphasis placed on the tourist in the days before highway competition is apparent.

The Fitchburg schedule on this page harks back to New England days before railroads in that section were consolidated into three large systems. The original folder is small, less than six inches high, and is printed in blue and black on green paper.

The Nashville, Chattanooga & St. Louis on page 21 not only gives through schedules but also contains much information for Florida-bound resorters. The illustrated spread opens to a length of two feet showing a colored map of the system and pictures of hotels and scenic spots along the route.

Also in the Gardner collection is a folder put out by the Alagoma Central in Canada, which offers box cars fitted as cabins. The road will spot these cars at any available siding. The passenger can fish at a different place each day and have his cabin moved for 20 cents a mile. Daily rental is $3 for three passengers.

The covers of the



ALTITUDES.

The country traversed by the Queen & Crescent Route between Cincinnati and Chattanooga has much charm of scenery, which is largely due to the varied altitudes reached by the road.

The height above the sea level of some of the better known points of interest is given below:

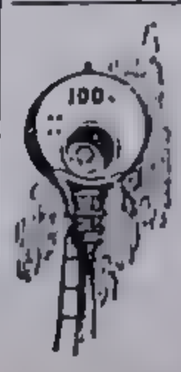
CINCINNATI—General level of the city proper	540 feet
Summits surrounding hills	900 "
ERLANGER, KY	905 "
ROGER'S GAP—(Entrance to the Blue Grass Region)	918 "
GEORGETOWN	875 "
LEXINGTON	966 "
HIGH BRIDGE—Height of track above river bed	286 "
Height above sea level	768 "
	988 "
JUNCTION CITY	1172 "
KING'S MOUNTAIN TUNNEL—Track	1287 "
Hill above Tunnel	
(Longest tunnel on the road—3984 feet long)	
SOMERSET	872 "
BURNSIDE—(Cumberland River Bridge)	746 "
UPLAND—(Cumberland Plateau)	1257 "
PINE KNOT, KY (Highest point on the line in Kentucky)	1414 "
ISHAM, TENN —(Kentucky and Tennessee State Line)	1339 "
FLAT GAP—(Summit of cut is highest point worked on the road) Summit	1362 "
Tracks	1514 "
	1519 "
MILE POST 209—(Highest point reached by the track)	1202 "
NEW RIVER	1152 "
LANCING—(The Emory River)	805 "
OAKDALE—(Southern terminus of the Mountain Div.)	810 "
HARRIMAN, TENNESSEE	
EMORY GAP STATION—Road here enters the Valley of the Tennessee	627 "
	673 "
ROCKWOOD	683 "
HIXON—(Tennessee River Bridge)	682 "
CHICKAMAUGA CREEK—	
CHICKAMAUGA NATIONAL PARK	1027 "
MISSIONARY RIDGE	670 "
CHATTANOOGA	2126 "
LOOKOUT MOUNTAIN	850 "
ATTALLA	600 "
BIRMINGHAM	150 "
YORK	309 "
MERIDIAN	172 "
TUSCALOOSA	143 "
HATTIESBURG	2 "
NEW ORLEANS	

41

Only Railroad South

Equipped with the

Electric Block Signals



The line between Cincinnati and Chattanooga is equipped in addition to the usual telegraph system, with an automatic system of Electric Block Signals. These signals will be noticed at intervals of from one to three miles along the track. The controlling force consists of an electric current running through the rails and acting on the magnets which hold the signals at "safety."

A cutting off of this current, either through a broken rail, a misplaced switch, a rail across the track, or a train or car standing or moving, will cause the signal to assume, by mere force of gravity, the position of "danger."

There are in use three distinct forms of Electric Block Signals: The "Semaphore," the "Disc" and the "Banner" Signals. The "Semaphore" Signals on the left, as seen from the rear of the train, west side of track, present to the engineer, first, a "safety" position, that is, at an angle of 45 degrees, if the track is clear, the blade changing to the danger or horizontal position as the locomotive passes it. With the "Disc" Signal a clear or white face is presented to the engineer, if the track is clear, changing to a bright red as the locomotive passes it. With the "Banner" Signal the edge of a red banner in an iron yoke is presented to the engineer, if the track is clear, the banner making a quarter revolution to the danger position, filling the yoke as the locomotive passes it. These danger positions will be held until the train has passed into the next Block, perhaps two miles in advance. The rear of the train is thus protected against any train that may be following.

At the same time the Signals on the east side of the track being set in the danger position a long distance in advance of a moving train, afford perfect protection from train moving in the opposite direction. These Signals, as the train proceeds, change from red to clear, or "safety." While the train is still from two to three miles away these Signals automatically turn to "danger," and remain in that position until the train passes out of the Block Section.

So, instantly, and with no probability of human forgetfulness, the train maintains, miles in advance, and miles in the rear, the silent witness of its progress, protecting the travelers, both day and night, asleep or awake.

BURNSIDE & BURKESVILLE TRANSPORTATION CO.

CUMBERLAND RIVER ROUTE

The electric lighted passenger steamer "Burkesville" leaves Burnside, Ky., every Wednesday at 3 pm for Burkesville, Ky., Celina, Tenn., Gainesboro, and Granville, Tenn., and returning arrives at Burnside Friday evening.

Also leaves Burnside every Saturday at 3 pm for Burkesville, Ky., Celina and Butler's Landing, Tenn. Returning arrives at Burnside Tuesday evening.

The new electric light passenger steamer "Burkesville" leaves Burnside, Ky., for Mill Springs daily except Sunday at 3 pm.

The Steamer Burnside makes connection with steamers for Nashville, Tenn.

Schedules are subject to change according to stage of water in river.

TO LOOKOUT MOUNTAIN.

On Incline No. 2 the first car leaves foot of Mountain at 6 40 am.; run every 20 minutes, and last car leaves the top of the Mountain at 7 00 pm.

ALABAMA CITY, GADSDEN AND ATTALLA RY.

Trains leave Gadsden 6 20 am. daily and every 20 minutes there after until 6 00 pm., also at 7 00, 8 00, and 9 00 p. m., arriving Q. & C. Depot Attalla thirty minutes later.

Leave Attalla (Q. & C. Depot) 6 00 am. daily and every half hour thereafter.

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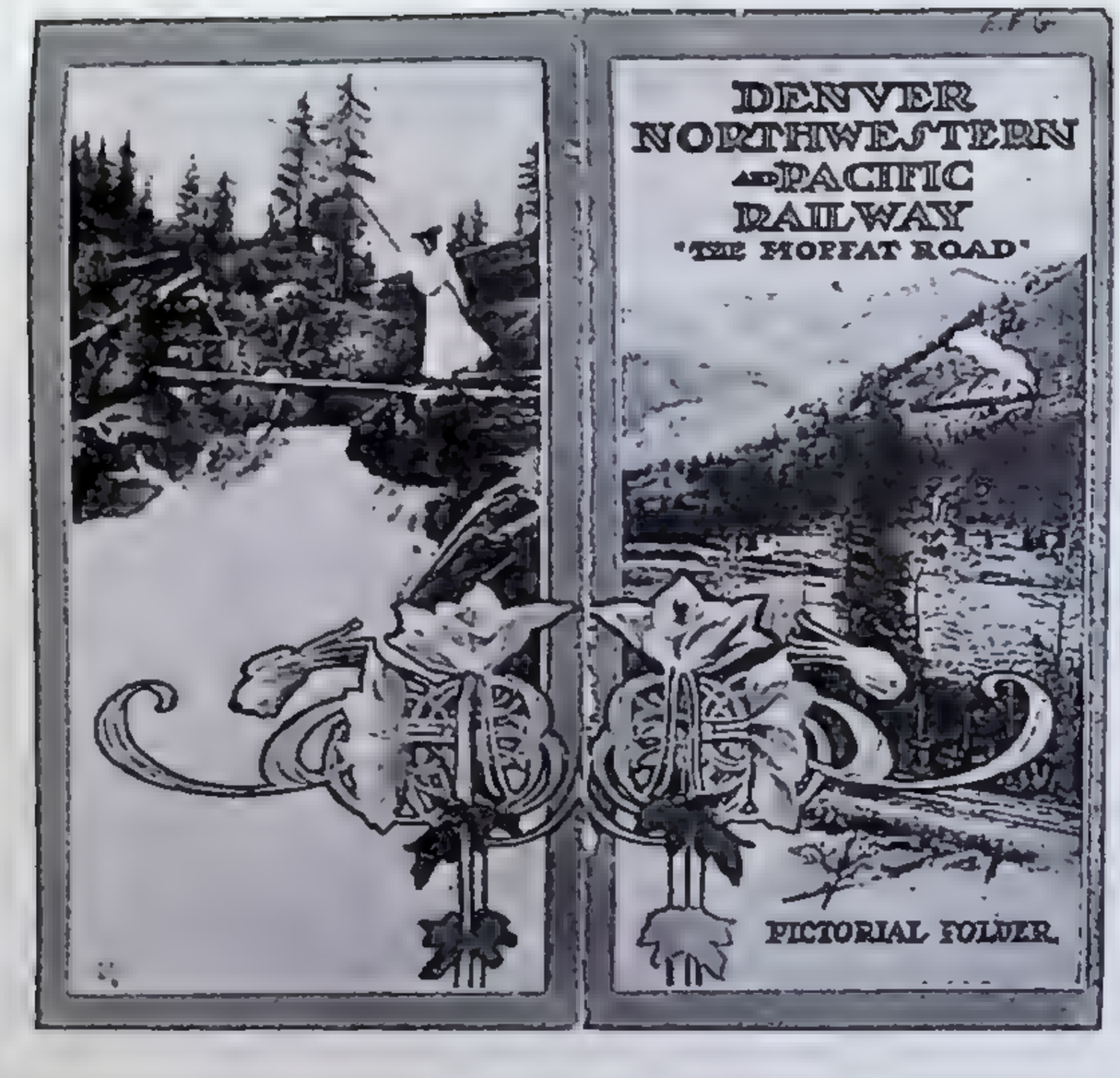
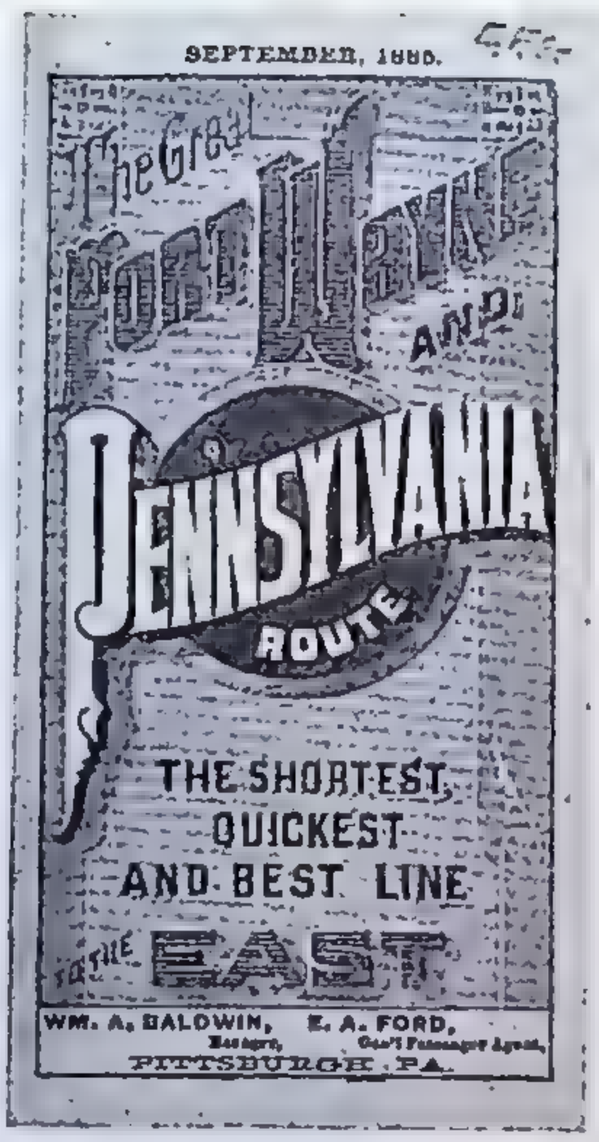
Illustrated with pieces from the collection of
E. F. GARDNER



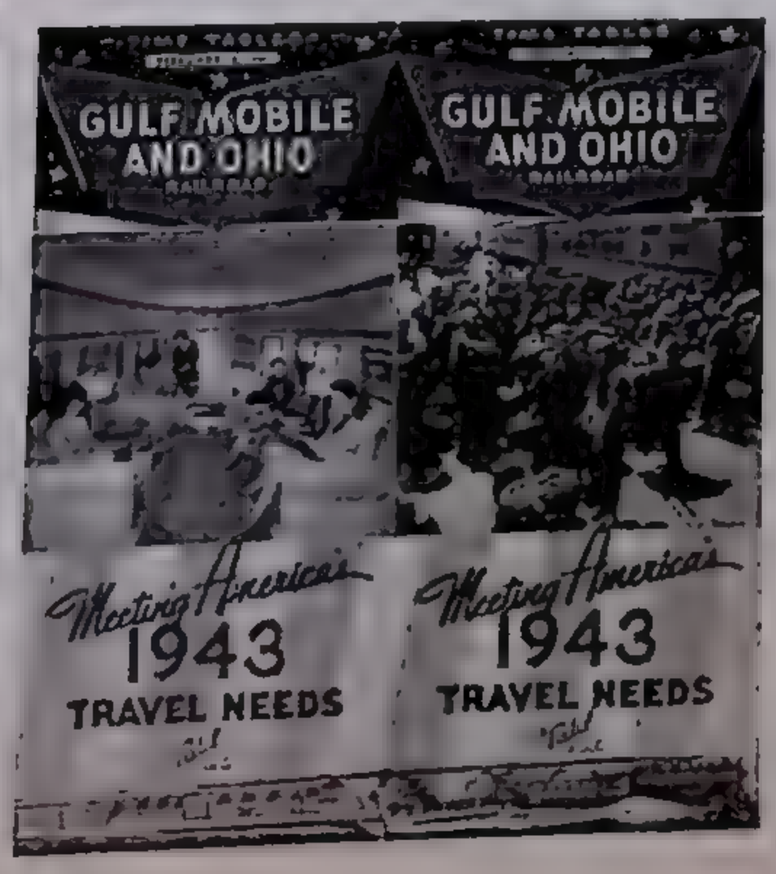


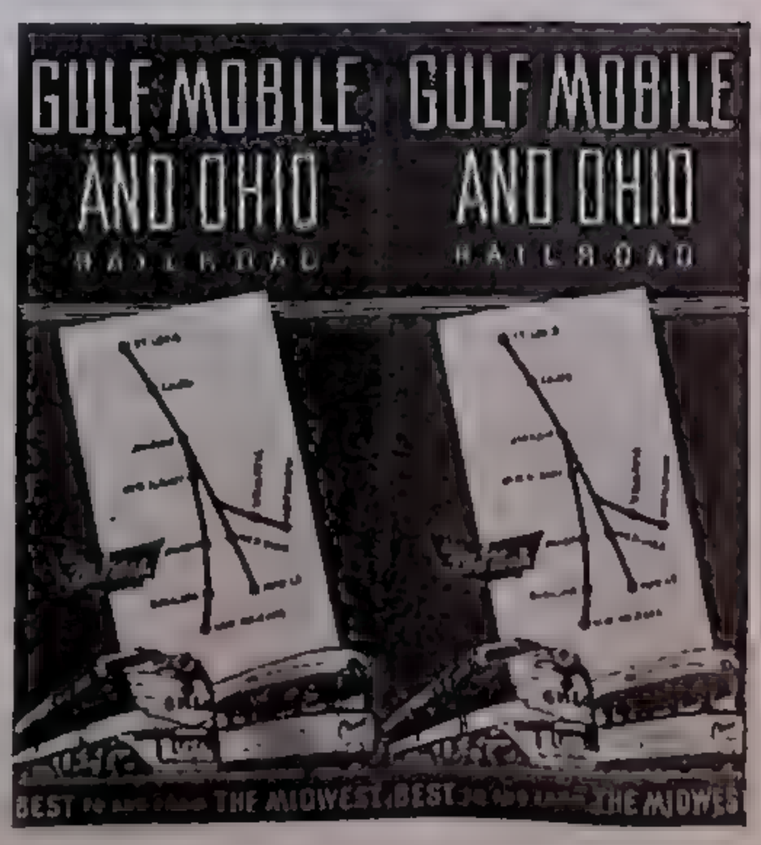
d Mission Inn—Riverside, California.
SALT LAKE ROUTE
SAN PEDRO LOS ANGELES — SALT LAKE RAILROAD
TRAVEL AND THE TELEGRAPH
They go side by side everywhere, the railway line, and the telegraph line, the arteries of modern communication.
The Western Union Telegraph Company is always at the service of travelers on the Salt Lake Route. In every station there is a Western Union Office. In parlor cars and in sleeping cars, there are Telegraph blanks always on hand. The train porter will file telegrams at the first station, and replies will overtake you within a short time. Write a Night Letter or a Day Letter to the folks at home, telling them of your delightful journey. The man of affairs is enabled to keep in touch by wire with his business every hour, clearing up details left behind and making new arrangements ahead. It is a convenience offered only to the American public.
The Salt Lake Route gives to travelers an assurance of personal comfort and safety. The Western Union affords them opportunity for quick and continuous communication enroute that is profitable in business life, comforting in family life to those left behind and pleasurable in making the engagements of social life.
The Western Union Telegraph Co.
OFFICES EVERYWHERE IN AMERICA

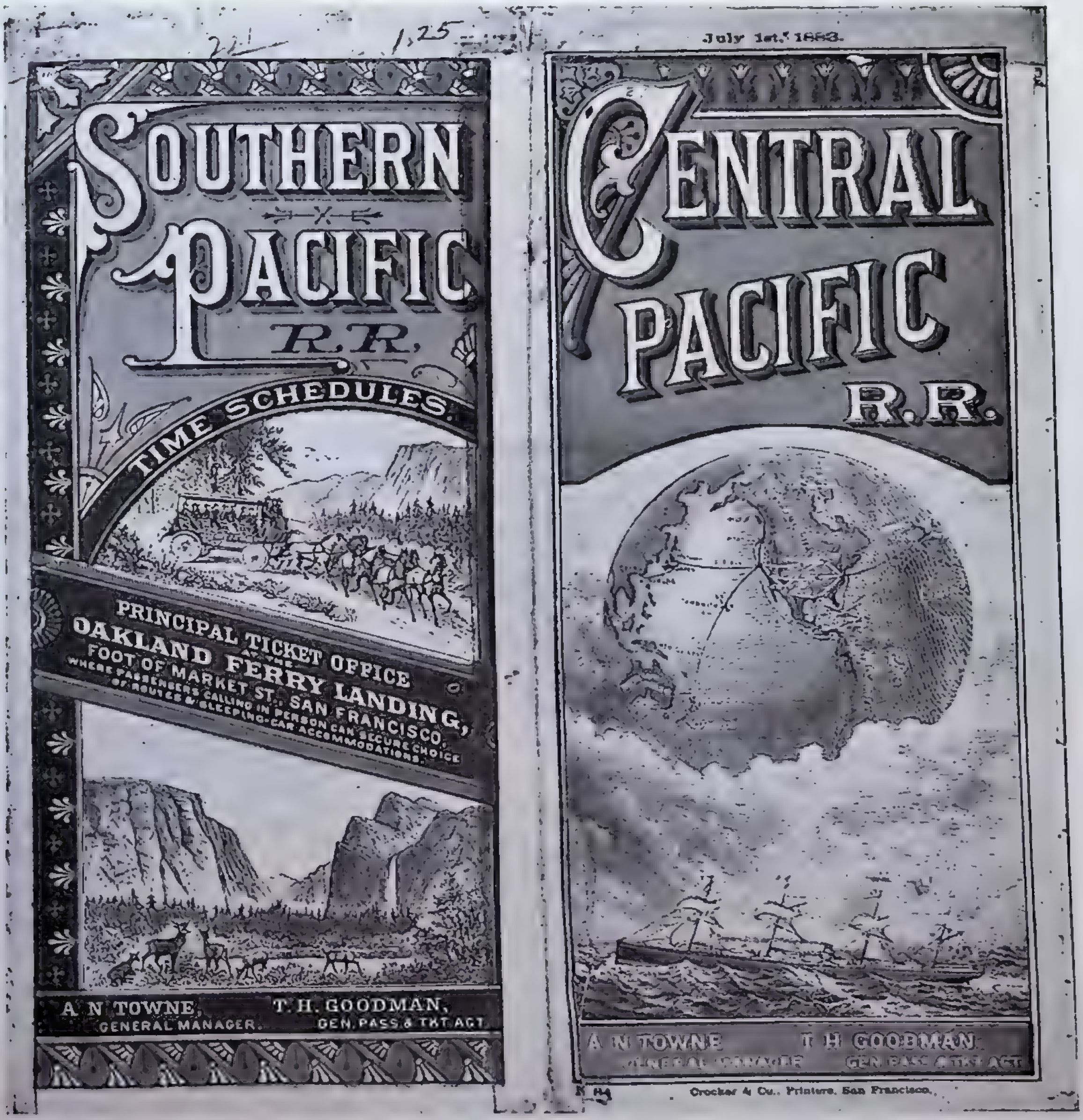
Denver, Northwestern & Pacific, now known as the Denver & Salt Lake, are an excellent example of the flourishing art of the "naughty-naught" period. On the bottom of this page are three consecutive years of contemporary design on the Gulf, Mobile & Ohio. The designer obtained variety yet retained an appearance recognizable as GM&O during the years of transition from peace to war.

The Salt Lake Route, properly the San Pedro, Los Angeles & Salt Lake Railroad, and now under Union Pacific's wing, produced a colorful schedule in 1916 from which the telegraph excerpt was taken. The map in the center spread of this folder is one of the various timetables that stretch the United States in any direction necessary to make the railroad look as direct and as easy to make connections with as possible. California is shown as wide as it is high in this case.

Before the vast Pennsylvania system was integrated






SOUTHERN PACIFIC R.R.
TIME SCHEDULES.
PRINCIPAL TICKET OFFICE AT THE OAKLAND FERRY LANDING, FOOT OF MARKET ST., SAN FRANCISCO,
WHERE PASSENGERS CALLING IN PERSON CAN SECURE CHOICE OF ROUTES & SLEEPING-CAR ACCOMMODATIONS.
A. N. TOWNE, GENERAL MANAGER.
T. H. GOODMAN, GEN. PASS & TKT AGT.
July 1st, 1883.
CENTRAL PACIFIC R.R.
A. N. TOWNE
T. H. GOODMAN
Crocker & Co., Printers, San Francisco.

into one unit, each line issued an independent time card. Two of these are shown on page 22. The Fort Wayne line was already emphasizing the word "Pennsylvania."

Perhaps the prize of the Gardner collection is the Southern Pacific-Central Pacific folder of 1883. Illustrated with many engravings of scenes such as the Oakland Mole and Sequoia trees, the folder opens into a large sheet, the back of which is a huge map of the territory west of Chicago and New Orleans. All Southern Pacific and Central Pacific lines are printed in red, connections in heavy black.

Modern railfans will find the projected lines indicated on this map of particular interest. At that time Central Pacific intended to build a line from Winnemucca, Nev., north through Oregon to a point north of Walla Walla, Wash. (This map was made before Spokane had become a city of importance.) Another line was proposed to Yosemite Valley. The Utah Central was erroneously shown as under construction from Milford, Utah, south and across the Grand Canyon to a connection on the Atlantic & Pacific. What a bridge would have been required to span that mile-deep, 10-mile wide gorge!

BURLINGTON
Burlington
Route

Top: Northbound X5507 rolls down the canyon with livestock, petroleum and miscellaneous freight. Left: At 9:10 a.m. southbound X5019 emerges from tunnel and crosses bridge with a trainload of cattle.

Burlington's Wind River Canyon

RECENTLY the Burlington sent their engineer-photographer, Fred W. Lehman, to Wyoming to obtain photographs of some of its new 5400-horsepower Deisel locomotives hauling long petroleum trains on the Denver-Billings run. Because these loads of fuel oil, destined for Pacific battlefronts, come from Texas, their time of passing any given point in Wyoming is uncertain. Knowing long waits for pictures would be inevitable, Lehman enlisted the aid of a section boss with a handcar and hied himself to Wind River Canyon. Shown on these pages are the photographic results of a busy day.

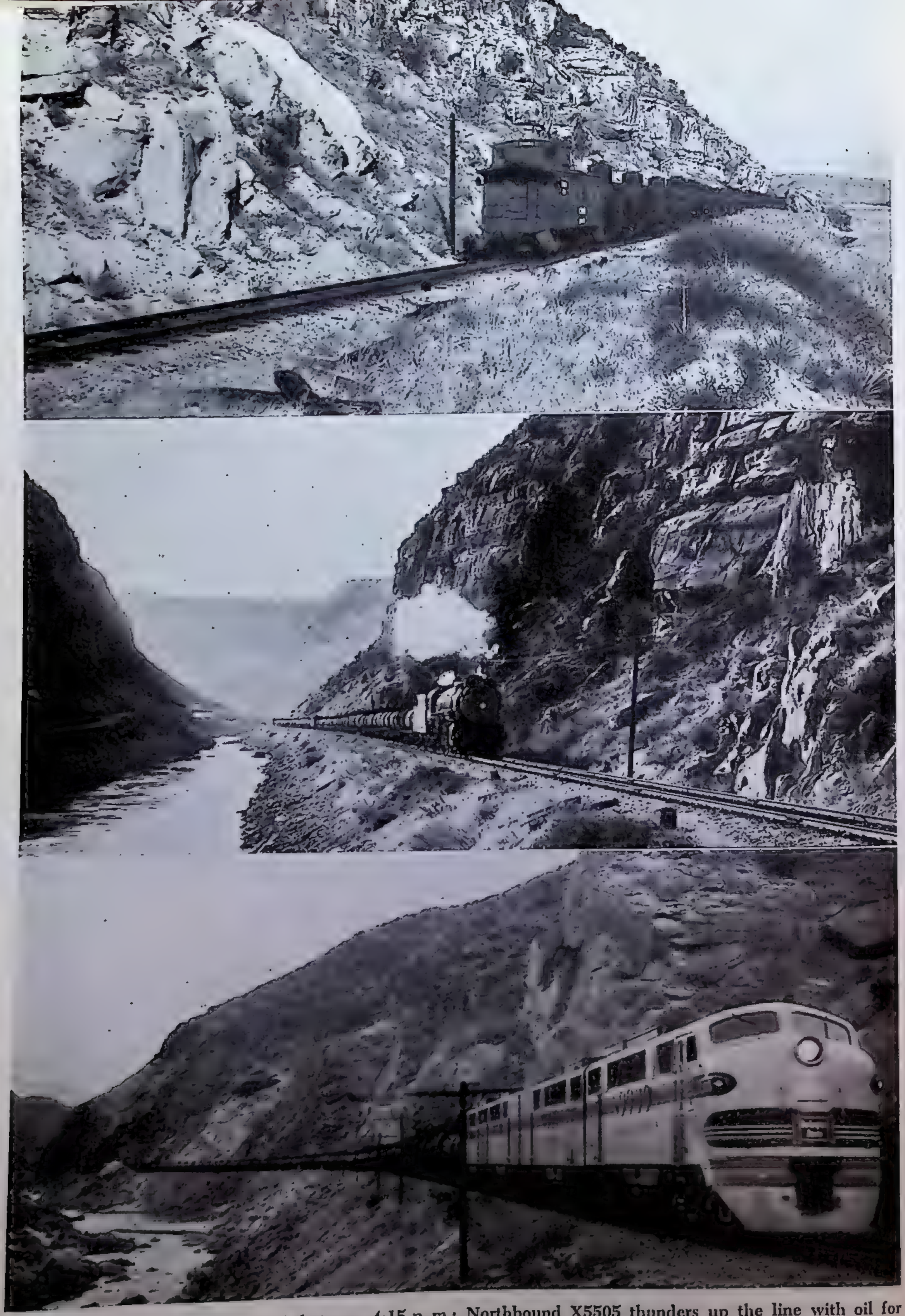
Little publicized Wind River Canyon, located in the northern part of central Wyoming, is one of the most scenic regions in America. The Burlington line was completed through it in 1912. Today it is a logical heavy traffic route from the Burlington's affiliated Colorado & Southern in the Texas oil fields to Northwest Pacific ports.

The time is 2:10 p.m. as southbound X5513, consisting largely of empty tanks, puffs up the rock-walled canyon. The locomotive is a Class O4 Mikado, built by Baldwin Locomotive Works in 1919.

Illustrations by
FRED W. LEHMAN

Although the pictures on these pages are representative of the traffic, Lehman necessarily missed getting pictures of several trains while traveling from point to point by handcar. Dissatisfied with his shot of the Deisel (bottom photo, page 28) Lehman went some 100 miles north to Sheep Canyon and obtained the striking scene on pages 24 and 25.

Southbound No. 30 glides through the canyon at 3:25 p.m. In addition to regular equipment it carries several troop sleepers. Track is crowded close to river by talus fallen from cliffs. This country is relatively barren and supports few settlers.



3:45 p. m.: Whoops! Nearly missed that one. 4:15 p. m.: Northbound X5505 thunders up the line with oil for the planes to Tokyo. 5:45 p. m.: End of day but a good twilight picture of Deisel No. 107 with a long line of petroleum tanks. Although comparatively early, marker lights and headlights are already burning.

Wartime Railfan Trip

2500 miles off the beaten track where passengers are rare even in these years of war

BY WILLIAM LEONARD

THOUGH the railfan trip is an almost vanished type of travel in the fourth year of a war making insatiable demands on the transportation system, a patriotic fan still can vacation to the tune of clicking rail, and at the same time keep out from underfoot of men with vital jobs to do in the war effort. He must be philosophical as well as persistent, be ready to sit through 23-hour layovers with patience, to tote his lunch on occasion, to keep his camera shuttered once in a while, and to fool himself into making sport of sundry other inconveniences.

Little traveled roads are still to be found, their slow day locals dragging along with coaches that never have seen a crowd, even during World War II, or their mixed trains stranding passengers momentarily in the quiet countryside while the locomotive picks up a freight car a mile ahead.

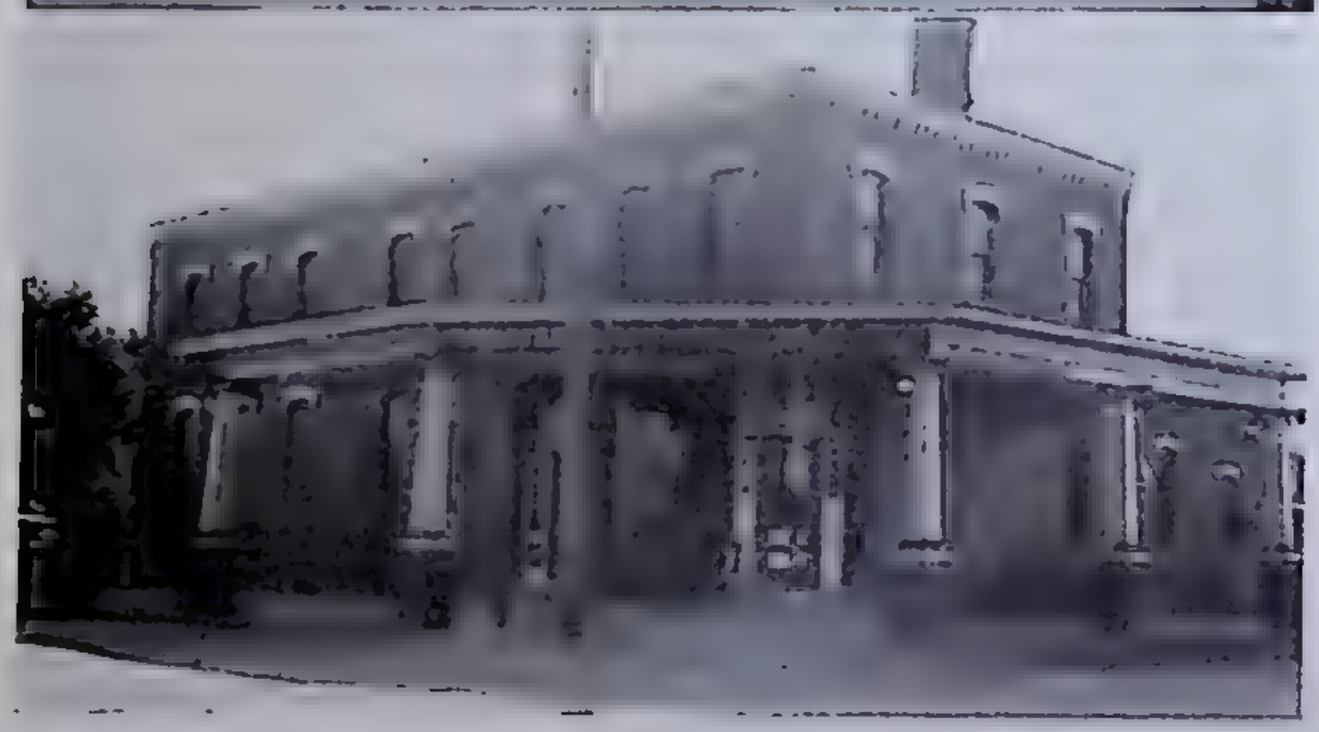
Last summer I made a 2500-mile excursion on 15 railroads (walking the entire length of one) in four states and one province of Canada, yet I never made a reservation, crossed the path of the war effort or witnessed a passenger car without numerous empty seats. My route for the most part was up where only one train runs a day, that one frequently lit by kerosene lamps or pinsch gas, and where the train crews say: "Go ahead, take all the pictures you want."

It started in Chicago with an electric ride on the Chicago, South Shore & South Bend to the interurban's Indiana terminus, and a 15-mile hop on the New York Central's afternoon local (No. 132) from South Bend to Elkhart.

The third leg was over the New York Central's "old line" between Elkhart and Toledo—the "Michigan Southern" segment of the old LS&MS. This uncrowded route now is traveled by only two passenger trains a day, a pair of locals which do the 143 miles in about five hours while the "name" trains are buzzing over the 10-mile shorter main line, farther south, in two or three.

Lima is 71 miles south of Toledo via the Toledo division of the B&O, and the morning local provides a pleasant ride with few passengers to disturb one's contemplation of the flat Ohio farms. Then a brief venture onto the Pennsylvania's main line, but only for 20 minutes, to Delphos, western terminus of the busy but little known Akron, Canton & Youngstown Railroad.

The AC&Y's 152 miles from Delphos to Cop-



One half of the passenger equipment of the Akron, Canton & Youngstown is represented by this combined baggage car-coach-caboose. Delphos, O., station is in the background. At Thompsonville, Mich., the Ann Arbor Railroad crosses the Pere Marquette. Bottom photo shows the Manistee & Northeastern's station at Manistee, Mich. M&NE is now part of Pere Marquette.

ley, just outside Akron, comprised the Northern Ohio Railway until January, 1944, when it was consolidated with the Akron, Canton & Youngstown Railway which had controlled it since 1920. A bustling hauler of soft coal, mine products, automobile tires and manufactures, the AC&Y has been a part of Ohio's scheme of things economic since the '90's, but its passenger traffic is so minuscule that the folks along its right of way never even have bothered to nickname it "the Amble, Creep and Yawn," or some such affectionate appellation of the kind bestowed by neighbors on most American short lines.

Every weekday morning a strange looking train consisting of a heavy 2-8-2 and a combination baggage car-coach-caboose pulls out of Delphos on a 162-mile run to Akron. A mile from the modest wooden depot, it changes aspect as the big Mike, one of many AC&Y Mikados built by the nearby Lima Locomotive Company, extracts a lengthy string of freight cars from a couple of tracks in the Delphos yard. The combination car is recoupled, this time to the rear of the train, and the passengers (if any) find themselves a quarter of a mile behind the motive power for the rest of the day.

A canning factory, a quarry and several other industries provide interesting switching maneuvers, the single-track roadbed can be observed handily from the rear platform, and if you've remembered to bring along some sandwiches the friendly crew will treat you to some of its coffee to wash them down. You will arrive in Akron closer to 6:30 p. m. than to the 4:30 "advertised," but the slow, grimy ride and picturesque car it is made in will fill a page in any rail-fan's memory.

It wouldn't be unpleasant to retrace your steps to Toledo, where we're going again, but just to add variety to the tour, a gasoline car leaves Akron the next day for Cleveland via a Pennsylvania branch. There are New York Central locals from Cleveland to Toledo with empty seats on midweek mornings, but an unnecessary 107-mile jaunt on a busy main line isn't in the spirit of this trip, so, railroad fever or not, the best way (and the longest, as usual) is by the overnight Dee & Gee lake boat to Detroit, then a 90-minute step to Toledo via Pere Marquette, Michigan Central or Pennsylvania.

The Ann Arbor Railroad, although controlled by the Wabash since 1925, operates as an independent line whose two trains, one a day in each direction, provide passenger service with pre-World War I quaintness and (what is more important for our immediate purposes) pre-World War II spaciousness. Hauling two coaches with beautifully tinted window transoms of no recent vintage, the northbound local (No. 51) leaves the Cherry Street terminal each weekday morn behind one of the Ann Arbor's three 38-year-old, Alco-built Atlantics.

Just 292 miles and approximately 11 hours later, it's in Frankfort, where it makes connections with the Ann Arbor's Lake Michigan ferries to Manitowoc, Kewaunee, Menominee and Manistique. Twenty miles short of Frankfort

and one hour earlier, however, members of this tour alight at Thompsonville, where they wait an hour and a half (sometimes much, much longer) for the Pere Marquette No. 106, southbound.

Eleven miles from the Thompsonville water tower is Kaleva, where the Manistee & Northeastern Railway's old-fashioned Consolidation No. 235 is waiting patiently to make the 20-mile, 40-minute connection with Manistee.

Until 1927, the M&NE wound a tortuous course of its own all the way from Manistee to Traverse City and Northport, but the midsection of the road was scrapped in that year and since 1932 it has been completely owned by the Pere Marquette. It still uses its own equipment, including a fleet of eight locomotives and a collection of cars guaranteed to restore a glint to the eye of the railroad antiquarian.

The only other passengers on No. 4 the day I rode it to Manistee last summer were three Manistee kids accompanied by their mother, who was taking them on a round trip outing to Kaleva for their first train ride. The M&NE makes two trips daily each way between Manistee and Kaleva, connecting with the PM northbound and southbound. The detour as far as the lake town is worthwhile if only to see the architecturally unique depot there.

The Pere Marquette's No. 101 from Chicago to Petoskey has plenty of empty seats by the time it gets to Kaleva, and the ride is comfortable and uncrowded to Traverse City and the other surviving link of the M&NE. A 24-hour layover permits an afternoon round trip on the 29-mile Northport branch and a round trip the following morning on the 14-mile Cedar City branch, before catching No. 101 again as far as Bellaire.

Bellaire is the western terminus of the East Jordan & Southern Railroad, whose 18.6 miles once contained lumber-road gaucheries that endeared the line to Charlevoix County folk as the "Easy, Jerky and Slow." Those days are gone forever, now, and the one train a day on the EJ&S is a gasoline car which hustles from East Jordan every afternoon to connect with the northbound Pere Marquette at Bellaire, but lets the southbound go by without a sign of recognition.

A rococo baggage car-coach stands on a siding at East Jordan, but the one steam locomotive is nowhere to be seen. The East Jordan Lumber Company, which operated the EJ&S, tore up 20 miles of branch lines in the early '30's, sold the road's 200 logging and flat cars and actually won I.C.C. permission, in 1932, to abandon the entire line. It's not very impressive looking these days, though the half dozen employees keep the rust from gathering on the 60-pound rail.

A few miles down the highway from East Jordan is Boyne City, western terminus of the seven-mile long Boyne City Railroad, all that remains of the Boyne City, Gaylord & Alpena which, until 1935, stretched 91 miles across the northern portion of lower Michigan. The station wagon which carries the United States mail in these parts also will carry you to Boyne City for 50 cents.

There is no passenger service on the BC, but if you can't arrange to ride a freight as far

Passenger service on the East Jordon & Southern is provided by a daily train which leaves East Jordon in the afternoon to connect with the northbound Pere Marquette at Bellaire, Mich. Equipment consists of this gasoline car. Coach No. 2 in lower photo is no longer in use. Formerly a heavy lumber road, the line now owns but one locomotive and a few cars.

Passengers of the Duluth, South Shore & Atlantic's afternoon train from Marquette rush to avail themselves of a 20-minute lunch stop at Trout Lake, Mich. Coaches of the Soo's train from Sault Ste. Marie are visible behind the mail trucks.

as Boyne Falls, don't be discouraged. I couldn't either, last August, and I've never regretted the seven-mile hike down the main line. A summer morning in this part of Michigan can provide a very pleasant memory, and when the Pennsylvania's No. 537 comes through Boyne Falls in midafternoon, there will be plenty of seats on it for you to rest in.

If you're familiar with the Pennsy's New York–Washington activities, the big electrics at Harrisburg or the *Broadway Limited* racing to Chicago, you'll have an added interest in this most far-flung branch of the big Pennsylvania system. It's a long way—in more than mileage—from the Pennsylvania Station in Manhattan to the weather-beaten wooden depot which marks the end of the line at little Mackinaw City, Mich.

First big wartime regret of the trip comes at Mackinaw. Here is one of the few passenger train ferries still operating in the United States, and it's also one of the few places on this route where tourists with cameras in hand are frowned upon.

Passengers board Duluth, South Shore & Atlantic coaches at Mackinaw City, and a Michigan Central switcher pushes them to the ferry. Few of the travelers spend the ensuing half hour in the gas-lit cars in the bowels of the boat. It's much better to stroll the upper deck to view the Straits of Mackinac and watch the DSS&A's little Atlantic drag the train off the ferry at St. Ignace and reassemble it.

Twenty-eight miles out of St. Ignace the South Shore connects at Trout Lake (sometimes) with the Soo Line for Sault Ste. Marie. The connection is uncertain, because the DSS&A waits at Mackinaw City for the Michigan Central's overnight train from Detroit, but the Soo's overnight train from Chicago doesn't wait at Trout Lake for the South Shore. If the Detroit train is very late at Mackinaw City, one has about five hours' time on his hands at Trout Lake—unless he chooses to take the bus from St. Ignace to the Soo, and that, of course, is out of the question!

The regular city ferry will take you across from Sault Ste. Marie, Mich., to Sault Ste. Marie, Ont., or you can take the Canadian Pacific to the other side and get a better view of the locks.

In the west end of the Canadian town, about a mile from the CPR station, is the building housing the offices and depot of the Algoma Central & Hudson Bay Railway, which pushes 296 miles north of the Soo to connect with the Canadian Pacific at Franz and the Canadian National's northernmost east-west line at Hearst, Ont.

Every Monday, Wednesday and Friday morning a little train, whose chimneyed coaches and dark green paint job give it an uncanny resemblance to the Rio Grande's surviving narrow gauge passenger trains, pushes off on the 12-hour trip behind a small, neat 4-6-0.

There is virtually no population in this part of Ontario, but American fishermen and hunters drop off along the southern half of the route, in a rugged land of eye-filling scenery not unlike that of the Pacific Great Eastern described in December 1944 TRAINS. The Agawa Canyon engulfs the train for 12 awesome miles and on clear days Lake Superior can be seen glistening many miles off to the west.

At Hawk Junction one coach switches off to Michipicoten Harbour while the rest of the train, including a cafe car featuring hearty but tasty fare, continues into a suddenly flat, sceneryless country. There are few sportsmen north of Oba. Lumber camps provide the only breaks in the topographical monotony by the time the conductor comes through the cars about dusk, applying a taper to the pinsch gas rings. Sometimes camp cars, rented from the railroad by vacationists, are set off at woodsy sidings. (See page 20.)

The northernmost part of the Algoma Central ride is likely to be traversed in the dark, so the reverse trip, leaving Hearst on Tuesday, Thursday and Saturday mornings, offers an opportunity to view the scenery, such as it is, that went by in the dark the evening before.

This wartime rail trip retraces its route, via Algoma Central and DSS&A, all the way to Mackinaw City, where the South Shore makes

a convenient connection with the Michigan Central's No. 202. This Detroit-bound train sometimes is well filled, even here at the end of the line, but members of this tour are on it for only 30 minutes until reaching Cheboygan, northern terminus of the Detroit & Mackinac Railway.

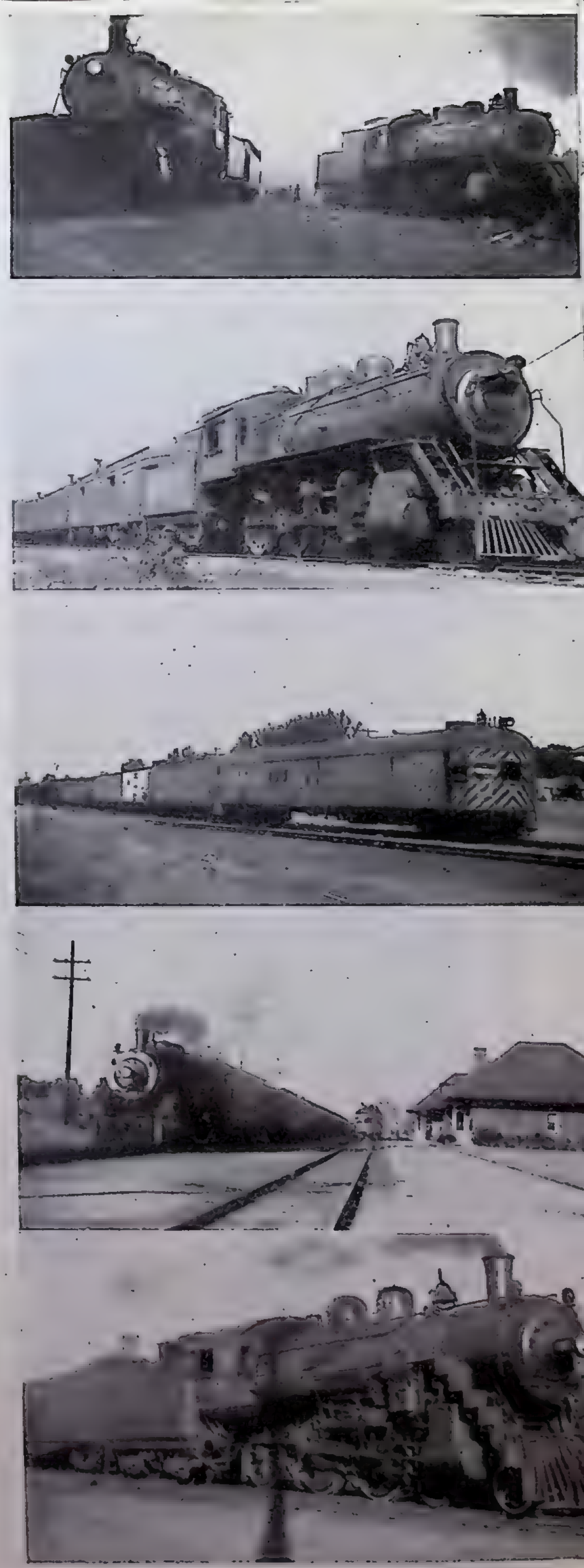
The D&M's passenger service between Cheboygan and Alpena is on a snorting Diesel car which often is saddled with a string of freight as well, although the heavy traffic on this northern portion of the "Lake Huron Shore Line" is committed to steam.

The northbound motor train (which isn't used on this tour) proffers one of those scheduling quirks which fill the Official Guide with surprises. It leaves Alpena every morning without a number, turns off the main line at Posen, depositing the passengers for an hour-and-a-half wait, becomes No. 71 as far as Rogers City, turns around, changes to No. 72, hustles back to Posen, picks up the mainline passengers, resumes its identity as the northbound local, and continues to Cheboygan.

At Alpena the southbound passenger changes to the steam train for Bay City, or waits for the motor to continue its trip the next morning. The Diesel has no advantage this biased reporter knows of; the steam train has a fine lounge car with big windows and an observation platform—and at no added cost. Leaving Cheboygan in midafternoon, the D&M passenger for Bay City traverses the 200 miles to that southern terminus by midevening.

A mixed train leaves Bay City at 11:45 the next morning on the Grand Trunk, negotiating the 53 miles to Durand by midafternoon. The Grand Trunk's No. 17 leaves Durand at 3:40 p. m., and is in South Bend, Ind., two hours and 15 minutes later.

There you can change to any one of a dozen Chicago, South Shore & South Bend electrics into Chicago. Surely you wouldn't want to ride all the way to the Loop on the Grand Trunk! That might be too far on one train for the spirit of this trip.



Both Alagoma Central & Hudson Bay 4-6-0's in top view were built by the Canadian Locomotive Co. in 1912. Second photo shows AC&HB three-times-weekly passenger train about to leave Hawk Junction, Ont. Passengers on the Detroit & Mackinac leave Cheboygan in motor car (with string of freight) and go to Alpena, Mich., to change to steam train (fourth photo) for Bay City. Bottom view is of D&M 4-6-0 pulling afternoon passenger train out of Alpena.

Steam Locomotives Without Fire

Switching locomotives charged with steam from stationary boilers suggest new type road locomotive

BY LAWRENCE W. SAGLE

Is THE steam engine through? Has the old "iron horse" outlived his usefulness? The proponents of one school of thought on the subject are busily engaged digging a wide and deep hole in which to bury the steam locomotive. They tell us that it is only a matter of time, and a short time at that, before the electric and Diesel-electric locomotives will shove the steam engine completely out of the picture.

That these types of power have some advantages in their favor is a recognized fact. The electric locomotive is a pack of power, receiv-

Is the Fireless Road Locomotive Practical?

TRAINS prints this "fireless cooker" road locomotive proposal as an interesting example of the many practical and impractical ideas which are always being bandied around by railroad men and railfans alike. To give the full cycle of such an idea we also print the following technical analysis by a prominent railway mechanical engineer who prefers to remain Richard Roe:

To haul a train of a given weight from one point to another at a given speed requires a certain amount of horsepower. If this power is to be developed by steam, a given weight of water will be needed. From data in the book "The Steam Locomotive" by R. P. Johnson, various papers found in the A.S.M.E. Transactions and the R.M.E., the following average consumption may be set up for a locomotive in passenger service:

Coal, 16.8 pounds per car mile.

Water, 83.3 pounds or 10 gallons per car mile.

With these basic figures and the assumption of a 10-car train plus locomotive operating for 100 miles we obtain the weight of coal and water needed for such a run, with the necessary safety factor added:

Coal, 20,000 pounds or 10 tons.

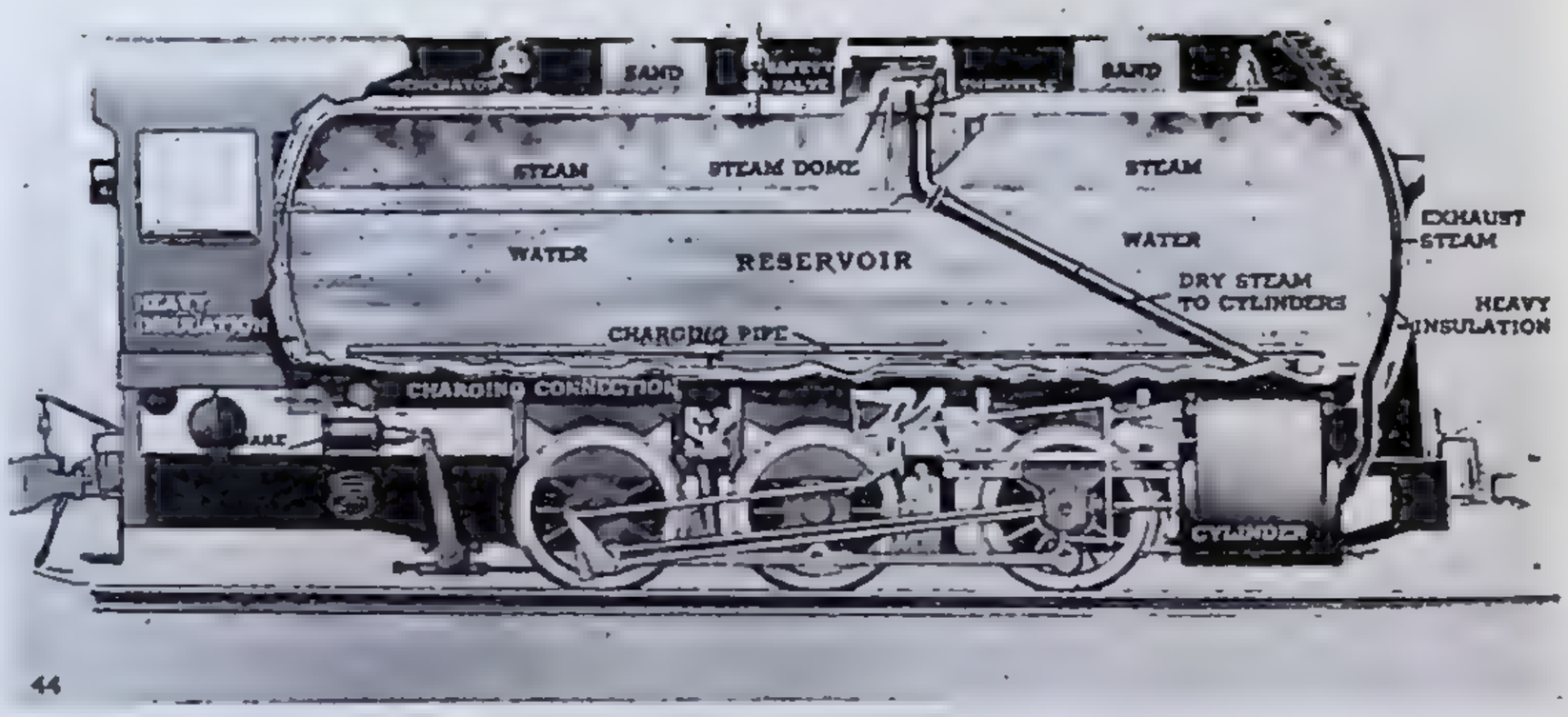
Water, 15,000 gallons or 62.5 tons.

For this discussion we'll not delve into the thermodynamics of the proposed fireless locomotive, but will examine it from the standpoint of weight, keeping in mind the I.C.C. boiler requirements which must be observed. We will also assume no greater water consumption than just figured, although we know that the fireless boiler would be found to require a somewhat larger amount of water if a thermodynamic study were made.

Therefore, we shall need a pressure vessel holding 15,000 gallons of water with some steam space at the top. For quick calculation we will use a 90-inch inside diameter drum, with 100-inch overall diameter, allowing 5 inches outside on each side for heavy plates and insulation. This is the maximum diameter with 80-inch drivers. Allowing for steam space, a 90-inch diameter drum would carry 290 gallons per foot of length and a drum 52 feet long would be required. This we can figure as the total wheelbase, allowing cab, drawbars, etc., to overhang. This corresponds to the overall wheelbase of the Pennsylvania 4-4-4-4. But the proposed fireless cooker with boiler water would weigh about 100 tons more, and even with six-wheel leading and trailing trucks would necessitate a 10-coupled driving wheel arrangement so as to keep the axle load within limits. This would complicate the machinery setup. Also, because all the steam would come out of the pressure vessel, the weight on drivers would vary by more than 100,000 pounds during the trip, and with axle loadings made small enough for good practice with the boiler full, the factor of adhesion would be too low with the boiler nearly empty. This variation in factor of adhesion would be very troublesome.

From the standpoint of cost the fireless road locomotive would not be economical because as the boiler pressure goes up the cost of construction multiplies much faster. The pressure vessel necessary would cost between $80,000 and $100,000 compared with $60,000, the approximate cost of the boiler and tender which it would replace. Very little upkeep would be saved, as the running repair costs of a locomotive are roughly divided: boiler, 30 per cent; tender, 10 per cent, and machinery, 60 per cent. Thus the fireless road locomotive would be a more expensive proposition even without adding in the cost of steam charging plants.

To allow for emergencies the operating department would insist upon a capacity much greater than just adequate and the result would be costs and weights even greater than those outlined. Thus the fireless locomotive is clearly impractical for road service because of greater cost, greater weight, and the extreme variation in weight on drivers.



Diagramatic view of typical fireless locomotive. Steam, fed into the tank through perforated charging pipe running along bottom, bubbles through water, heating it thoroughly.

ing almost unlimited energy, from a remote power plant through wires. However, its operation is limited. It cannot leave the restricted area served by the wire or third rail that delivers its energy to it. When there is a failure to the electric power line, or when the trains must detour on account of accidents, the helpless electric locomotive must suffer the ignominy of being hauled by a steam locomotive.

On the other hand, the Deisel-electric locomotive is in fact an electric locomotive that carries its generating plant with it. It can go anywhere, provided it can obtain a plentiful supply of fuel oil to keep its electric generating plant working to furnish the current to the motors on its axles. It is not dependent on a remote power plant to furnish its "juice" by wire or rail, but its power is limited to the capacity of the Diesel engines. Only in areas of high density traffic is electrification practical and economical. Therefore, the Diesel locomotive is a greater threat to the steam locomotive than is the electric engine. But before we go further into the pros and cons of the matter, let us examine the limitations, and advantages, of the steam locomotive.

Like the poor, lumbering turtle, who slowly creeps along dragging his house with him, the huge, thundering locomotive is an engine carrying its steam producing plant on its back, and dragging the dead weight of its fuel and water behind it.

"An engine is a machine by which power is applied for the performance of work," sings Webster's Dictionary in dulcet tones. The cylinders, pistons, rods and cranks that turn the wheels of a locomotive constitute an engine in the accepted sense of the term. And the power in the cylinder is the product of expanding steam delivered there, usually at high pressure.

If your steam engine is sitting on the floor of a powerhouse and its energy is devoted to turning dynamos, mills, or machinery, its steam will come from a large boiler in an adjacent boiler house. That boiler will be large enough to furnish an adequate supply of steam; the coal necessary to supply this will be piled mountain high outside the door.

In contrast to all of this, consider the plight of the railway locomotive. It must run on a track with the rails 4 feet 8½ inches apart. Due to the size of existing tunnels, bridges and structures alongside the tracks, 15 feet is about the maximum height and 11 feet the allowable width. The only thing that restricts the length of a locomotive—within reason—is the fact that it must go around curves, and must not be too long for the turntables at engine terminals. In space confined by these restrictions the locomotive must live.

The boiler of a modern locomotive is a steam producing marvel, firebox, combustion chamber, feedwater heater, steam superheater, hundreds of feet of flues and pipes, all for the purpose of converting water into steam rapidly enough to supply an adequate and unfailing flow of power to the cylinders below. Great quantities of coal and water must be carried to feed the hungry firebox and boiler. The locomotive tender has been growing along with the locomotive. It is not unusual for it to carry 20,000 gallons of water. Even that doesn't last indefinitely. And to feed the fire the tender must be capable of carrying 25 tons or more of coal. And at that, fuel must be replenished at from 100- to 200-mile intervals and water more frequently.

Will the steam locomotive ever rid itself of that "old man of the sea," the huge dead weight

Built by Baldwin Locomotive Works, this fireless 0-6-0 is in switching service at Eastman Kodak Company. The locomotive has a total weight of 148,000 pounds and a working pressure of 60 pounds.

tender that it must drag along behind it? Is it possible to run a locomotive without a fire in the firebox? Or, can we also dispense with the firebox along with the tender? You may be surprised to learn that it is not only possible, but is an accomplished fact. If you should visit the sugar plantations in Cuba, you would see strange little tenderless locomotives switching cars of cane back and forth. You would be conscious of the absence of black smoke, and even the absence of a smokestack. These little engines are "fireless locomotives." But you need not go to Cuba to see a fireless locomotive. The Eastman Kodak Company in Rochester, N. Y., the National Cash Register Company in Dayton, O., and the Mead Corporation in Chillicothe, O., to mention but a few companies in the United States, use this type of locomotive in switching service.

The fireless is one of the most remarkable and foolproof locomotives ever devised, being merely a steam locomotive equipped with a large tank, or reservoir, instead of a boiler and firebox. It carries no fire. It uses steam generated in the large boilers of the industrial plants where it operates.

The fireless locomotive operates on the principle that water has a certain capacity to absorb heat and then to yield it for generating steam from that same water. First, the reservoir is filled about two thirds with water. Then a pipe carrying steam at high pressure from a stationary boiler is connected to a special coupling and valve on the engine. The steam is fed into the tank, or reservoir, through a long perforated pipe which runs along the bottom, allowing the steam to heat the water thoroughly as it bubbles up through it. The steam is injected until the pressure in the reservoir equals the pressure in the stationary boiler, usually 200 pounds to the square inch or more.

The pressure in the reservoir falls as the steam is used by the cylinders and this lowers the boiling point, causing more water to evaporate. The evaporation continues until the temperature of the water drops to the temperature of the steam at the "working pressure," which is usually 50 pounds to the square inch. When it reaches this point, the reservoir must be recharged.

Most fireless locomotives will operate from two to four hours on a charge, depending on the capacity of the reservoir and the type of service. Working pressures in the cylinders are usually low, say 50 pounds to the square inch, and a special reducing valve is used in the steam pipe between the throttle and cylinders. This delivers a specified working pressure to the cylinders at all times, regardless of how high the pressure might be in the reservoir. In instances where air brakes are used, the compressed air for these usually is supplied by a stationary air compressor.

Fireless locomotives were first used on the Crescent City Railroad of New Orleans in 1872, according to R. K. Johnson in an article in

Baldwin Locomotives, July, 1925. He attributes the design to a Dr. Lamm. This type of engine was next introduced by M. Leon Franq in 1786, on the tramway running from St. Augustin, Paris, to the Boulevard du Chateau at Neuilly. Dr. Lamm's design was crude and unsatisfactory. The reservoir was completely refilled after each run and there was no variable valve cut-off arrangement or other device for conserving the steam supply. M. Francq improved on Dr. Lamm's design by using a reducing valve and placing an atmospheric condenser on top of the reservoir to take the exhaust steam. It was he, also, who first conceived the idea of injecting high temperature steam into the reservoir instead of emptying and refilling after each run.

Further improvement in the design and operation of this type of locomotive was made in the same year, 1876, by Theodore Schaffer. Eight locomotives of his design were built at Patterson, N. J., for the Crescent City Railroad. Schaffer patented a valve gear consisting of a main valve working full stroke to control the exhaust, with an auxiliary valve on top to govern the admission of steam to the cylinders, both controlled by the same valve motion link. These locomotives took steam from stationary boilers at 220 pounds pressure.

In both Schaffer's and Francq's designs, the charging connection was in the upper part of the reservoir. This proved to be unsatisfactory as the water in the reservoir would not heat up uniformly. The lower strata of water remained comparatively cool, although the temperature and pressure in the region of the intake pipe would quickly rise to the 220 pounds pressure of the charging boiler. This resulted in the pressure in the engine dropping rapidly from 220 pounds to 190. In spite of this handicap, the locomotive would run 3½ miles before the pressure decreased to 100 pounds. This difficulty was finally overcome by use of the long perforated pipe for steam injection at the bottom of the reservoir. The Baldwin Locomotive Works and the H. K. Porter Company of Pittsburgh have manufactured many locomotives of this type for foreign and domestic use.

These locomotives are clean, almost noiseless and efficient. But what about this type in road service? No, it hasn't even been considered, in so far as we can learn. Would it be practical? Let us indulge in a prophecy, and conjure up a vision of a railroad at some future date using fireless locomotives. As we walk down the side of our low slung, lightweight, streamlined train, our attention is arrested by the strange con-

Crew waits as engine is recharged with steam at generating plant. The reservoir can be refilled in approximately 30 minutes. Drivers of this locomotive are shown on page 38.

traption on the head end. There is a cab at the front of a huge, smooth, streamlined tank. The high drive wheels, cylinders, rods and valve motion are of the familiar steam locomotive type, but that is as far as the comparison goes. The cab is on the front end of what seems to be a boiler, but *there is no tender!* It is a "fireless." It will haul our train for 100 miles in 45 minutes.

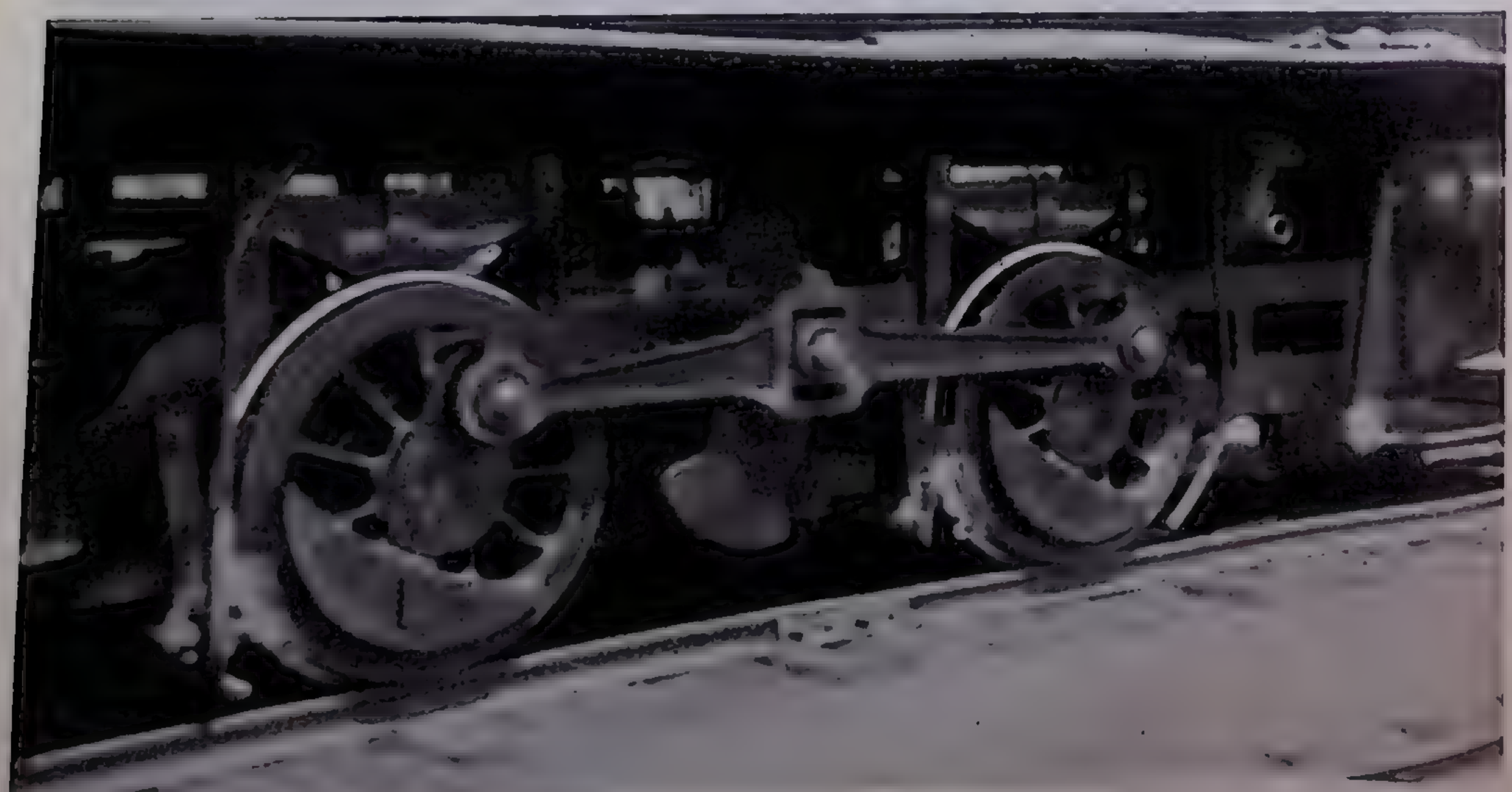
"Ah," jeer our critics in chorus, "what will you do then? It takes about a half hour to charge a fireless locomotive. Will your train dawdle at each station that long and thus lose valuable time?"

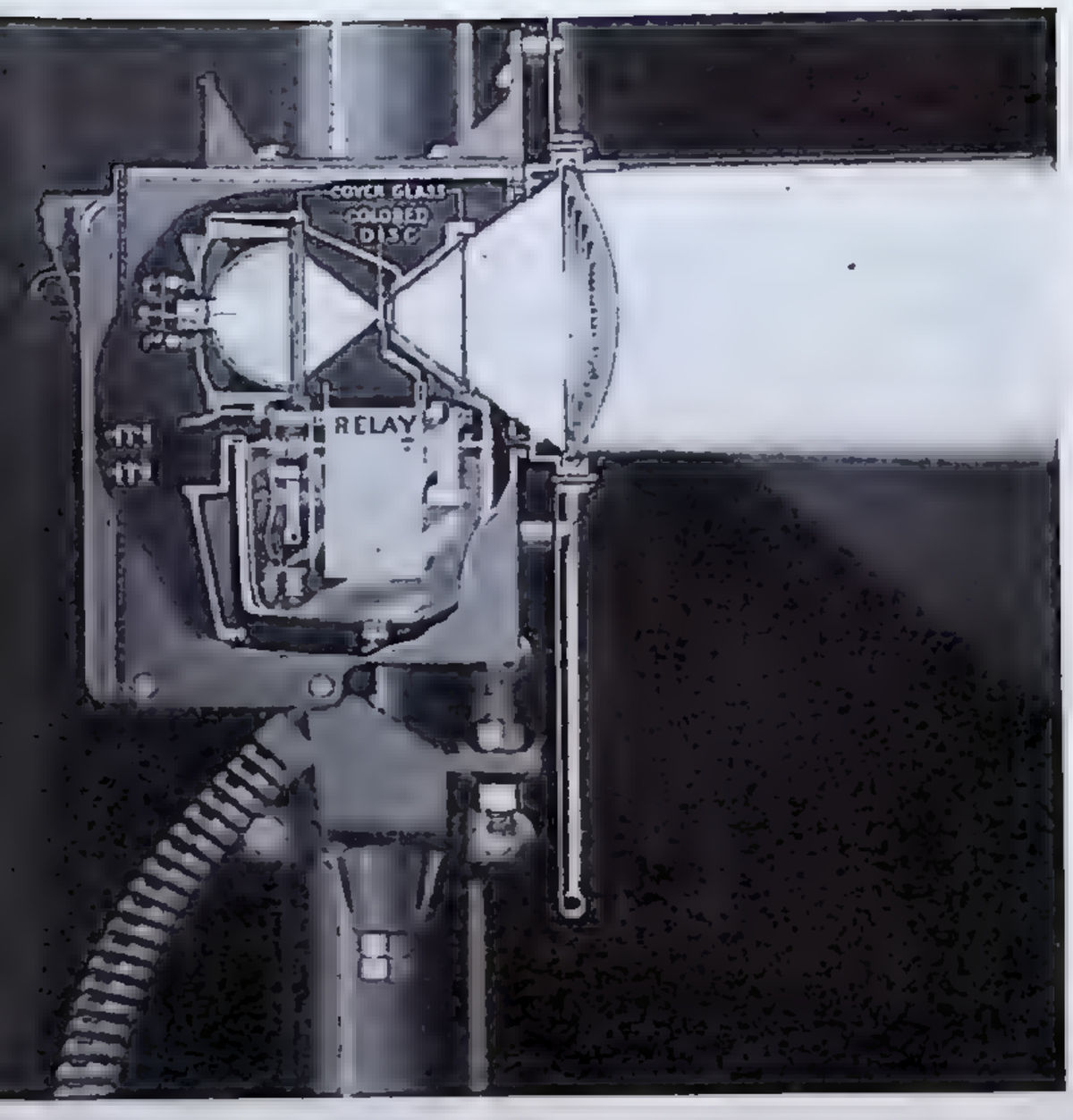
Without batting an eyelash, we come right back at these sceptics and say that we will have a duplicate locomotive, already charged and waiting, to replace the one that brought the train in. The cost of these locomotives will be surprisingly low compared with modern types now in service. We can afford to have a great many. There will always be a charged locomotive waiting for each train, and it should be but a matter of a few minutes to detach one and couple on the other. The detached engine would then go to the charging plant, refill its reservoir with steam and be ready to take out another train a half hour later.

Impossible? Perhaps, and then maybe not! The reservoirs on the locomotive could be four or five times the size of those on the little switchers now in use, and could be built strong enough to withstand a pressure of 1000 pounds to the square inch. At 100-mile intervals along the line, or at other convenient stopping points, there would be large boilers of high capacity to furnish the steam for charging the locomotives. Compressed air would also be furnished at these stations. Or maybe a vacuum brake will be more practical on such a train. Perhaps a steam pipe along the entire line of the railroad would be practical, the pressure of steam being kept constant by boiler plants along the line. Outlets at one- or two-mile intervals would permit the locomotives to recharge their reservoirs between stations, if necessary.

That low, ominous rumble I hear is the combined voices of all the railroad mechanical engineers swelling in protest. The cost would be prohibitive! What kind of steel and construction would be necessary to confine 1000 pounds pressure to the square inch? But I say, "What the heck!" Fireless locomotives are practical for switching service. They are simple in construction. Just as the locomotive builders of 100 years ago could not visualize the giant locomotives of today, why, then, should we suppose that engineering experience of the future may not make the fireless locomotive practical for high speed road service?

Cylinders are located between the frames on this engine and drive the wheels through a jackshaft midway between axles. The steam charging connection is visible at upper right directly in front of brake cylinder.





The mechanism of the searchlight type signal used on modern railroads is one of the simplest yet most effective of safety devices. The only parts required for the signal are a long life bulb, a parbolic reflector, and a clear glass lens. The beam of concentrated light passes through a vane of red, yellow and green spectacles. The position of the vane is controlled by a small electromagnet. In event of equipment failure the signal automatically drops to red.

Freight Rate Economy

Railroads handle approximately 125 million separate freight shipments annually.

The railroads have demonstrated that they have the power and the capacity to handle 72 per cent of the greatest volume of traffic the country has ever known. Why, then, should the public be saddled with new rates to provide funds for additional transportation facilities—the deepening of inland waterways and the construction of super highways? I have yet to hear anyone propose the use of public funds for the benefit of the railroads. No one has come forward to urge that they be given free rights of way. —*L. W. Baldwin, President, Missouri Pacific Lines.*

Railroad Class Divisions

For statistical purposes, railroads are divided into three classes, as follows: Class One railroads, each having operating revenues above $1,000,000 a year; Class Two railroads, each having operating revenues above $100,000 and not exceeding $1,000,000 a year; and Class Three railroads, each having operating revenues up to $100,000 a year. (Roman numerals—I, II and III—are usually used in designating them.) Switching and terminal companies include local switching railroads, industrial railroads, port railroads, stockyard railroads, bridge and ferry companies, union station companies and various other local railway companies not engaged in line-haul operations.—*Booster.*

This is what you see when you sit in the cab of a Deisel. Perfect visibility under all conditions is a valuable asset to the engineer on this new Northern Pacific 5400-horsepower freight locomotive shown at Scoria, N. Dak.

Peace, It's Wonderful

Traveling through the Midwest some time ago on a streamlined express, Emil Ludwig, author, found it impossible to think because the radio in his car made such a racket. He made his way to the adjoining car, hoping to find peace and quiet, but that car was also equipped with a blaring radio.

He walked the entire length of the train, searching for a secluded spot where he could mediate without disturbance. But everywhere he went the radio was on full blast. In disgust, he plunked himself down on the platform between the cars and prepared to write. A roving conductor found him there a moment later and ordered him inside.

"But I cannot think inside," complained Ludwig. "Everywhere I go, there are radios, radios. Why do you have so many radios, anyway?"

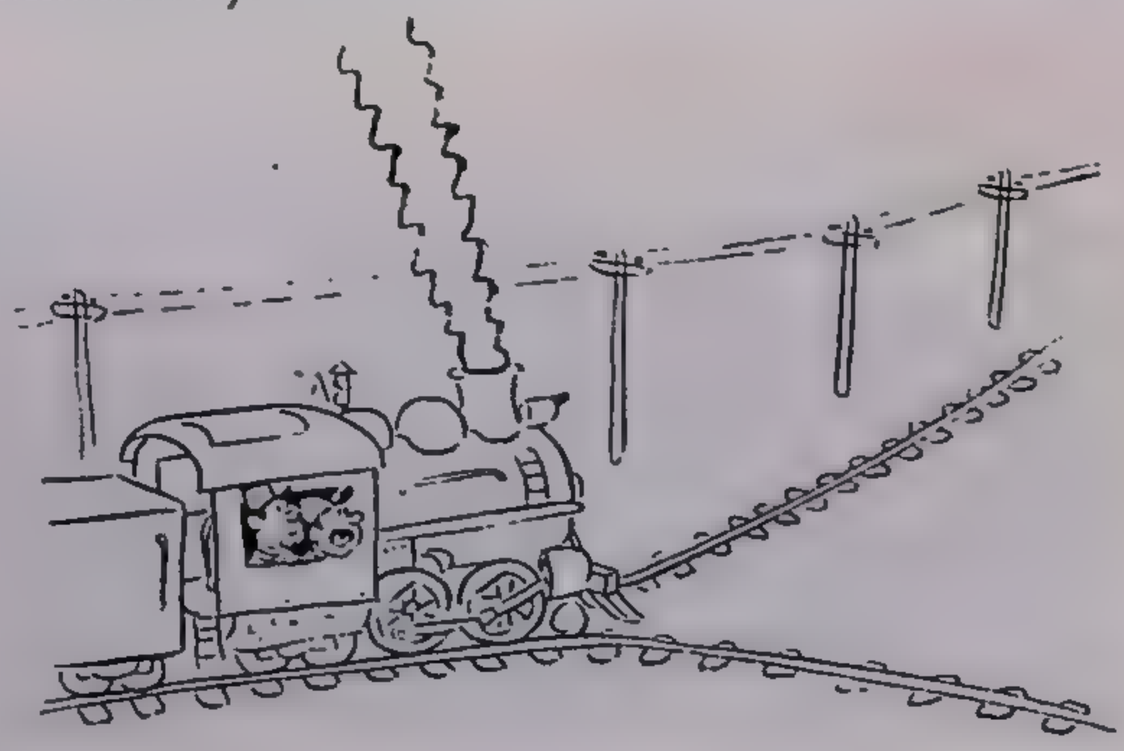
"The passengers like it."

"How do you know?" demanded Ludwig. "Have you asked them?"

"Oh, a wise guy, huh?" growled the conductor, annoyed by this childish quibbling.

But Ludwig insisted that a vote be taken. From car to car the two made their way, marking the pros and cons. When the votes were tabulated, it was discovered that only three passengers wanted to hear the radio.

The dumfounded conductor looked at Ludwig in bewilderment. Ludwig, equally surprised, but delighted by the turn of events, found himself a soft, roomy chair and started to write—sans radio—*The Milwaukee Journal.*



"This must be where the road gang had that big argument!"

The Locomotive Is a Soldier

Photos of military locomotives

Principal dimensions of standard locomotives which have been winning the war are released

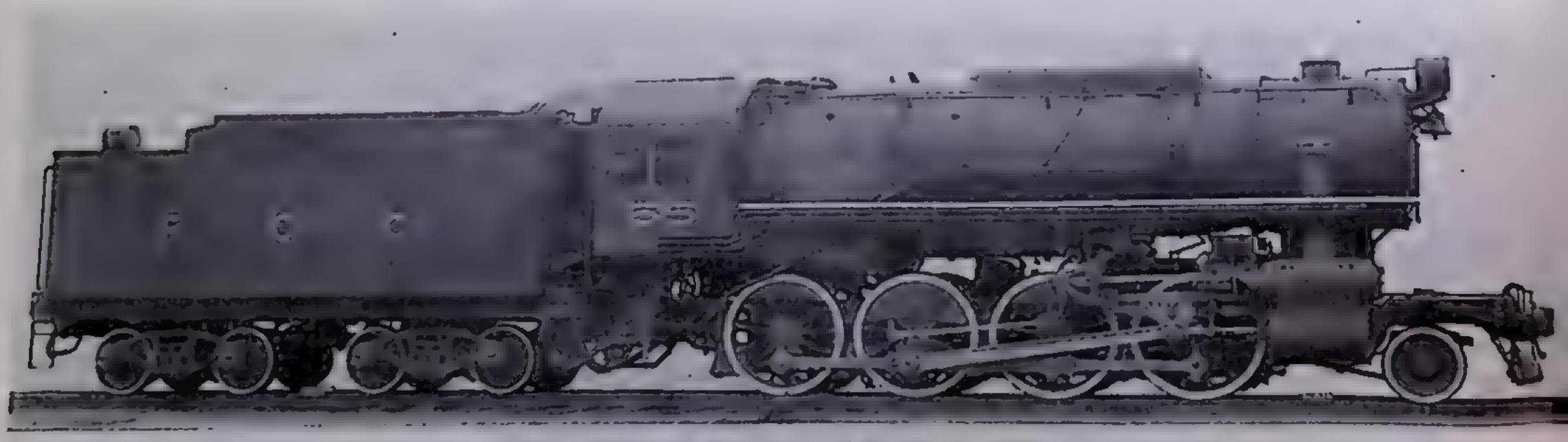
WHEN the war has been won and the inside stories are finally told, the military locomotives will stand along with the jeep, the tank and the other important tools of battle. For the locomotive is a soldier and without it modern mechanized war would be impossible. Supplies in the terms of tens of thousands of tons cannot be transported overland except by railroad—and it is taking a war to prove to some people that this is still just as true as it was before the invention of the motor truck and the airplane.

If any one locomotive deserves the glory it is the standard Consolidation which has been dubbed by the Military Railway Service men as the G. I. Consolidation. Thousands of these 2-8-0's have been built by American plants and have been shipped to all parts of the globe. They are simple locomotives not loaded down with all the modern devices to increase thermal efficiency. Their purpose is to move traffic to run under any conditions and that they do.

The large photo shows one of the standard 2-8-0's pulling freight in England while the other four photos are builders' views (Alco) of the 2-8-0 in three dresses and a narrow gauge 2-8-2. The 2-8-0 was also built in quantity by Baldwin and Lima.

Principal dimensions:

	2-8-0	2-8-2
Gauge, in.	56½	39⅜
Tractive effort, lbs.	31,500	20,100
Cylinder diameter and stroke, in.	19x26	16x24
Driver diameter, in.	57	48
Weight on drivers, lbs.	140,000	80,000
Weight on pilot trucks, lbs.	21,000	19,000
Weight on trailing truck, lbs.		20,000
Weight of engine, lbs.	161,000	119,000
Weight of tender, working order, lbs.	115,500	97,600
Steam pressure, lbs.	225	185
Grate area, sq. ft.	41	27.7
Evaporative heating surface, sq. ft.	1765	1371
Tender capacity: Gallons of water	6500	5000
Tons of coal	10	9



Standard Consolidation for Central Railway of Peru.

Mikado shipped on British Lend Lease to India.

0

Above, courtesy Associated British & Irish Railways, Inc.; other photos, American Locomotive Company.

Standard Consolidation built for U. S. War Department.

Standard Consolidation built to 5-foot gauge for Russian government.

The Show goes on at 4:45

WITHIN little more than an hour's time, 35 passenger trains steam out of the Erie Jersey City Terminal, down the four track main line, and through Bergen hill. Powered by various types of motive power, this flow of commuter trains continues in a steady stream from 4:45 to 6:05 P.M.

Think of the behind-the-scenes planning and organization necessary to deliver this kind of split-second timing and coordination in serving more than 20,000 commuters every working day in the year. Operation like this is typical of the way in which Erie is carrying on its big freight and passenger transportation job throughout the Heart of Industrial America.

More Detailed Facts

about this interesting railroad operation are yours for the asking. A complete story about the Erie commuter train service has been prepared in leaflet form—with details, diagrams, and photographs. Fill out and mail the convenient coupon below for your free copy.

If you're in New York or vicinity, or plan to be there in the future, you can see this interesting show for yourself at Palisade Avenue, Jersey City, over the Bergen Cut of the Erie Railroad. You'll enjoy it more if you have the descriptive leaflet!

Erie Railroad

ONE OF AMERICA'S RAILROADS—ALL UNITED FOR VICTORY

R. B. Rogers, Passenger Traffic Mgr., Erie Railroad, Midland Building, Cleveland 15, Ohio. Please send a copy of the leaflet on Erie's commuter train operation to:

Name_____

Address_____

City_____ State_____

Early Erie Ancestor

FROM THE HILLS TO THE HUDSON, by Walter Lucas. 319 pages, 6"x9". $4. Sponsored by the Railroadians and published by Pierce Business Book Co., 106 Greenwich St., New York 6, N. Y.

VOLUMES have been written on the histories of the large railroads, but the small local roads, organized, built and run for more limited purposes, have been overlooked. "From the Hills to the Hudson" corrects this oversight by telling the story of the Paterson & Hudson River Railroad and its associate lines which later became the Erie's main line from Suffern to Jersey City.

Contemporary newspaper extracts are used in profusion, making a book which though difficult to read is extremely realistic and detailed in its picture of the trials of early railroad financing, construction and operation. Altogether this is a very interesting book because the story of the Paterson road is also the story of all the hundreds and thousands of little railroads of a century ago, the railroads which were the foundation of today's railroad network.

OWN YOUR OWN RAILROAD

Building scale models of cars, locomotives and even the right of way, itself, is a hobby leading to endless enjoyment.

Write for our booklet on miniature railroading along with our pre-war catalogue—It's interesting reading—Price 25c.

MANTUA METAL PRODUCTS CO.
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RICHARDS MADE A SPEECH

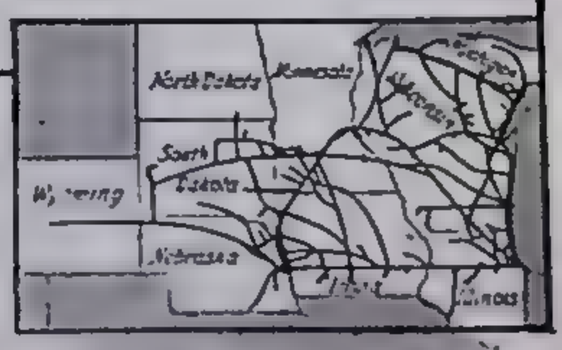
and "Safety First" was born

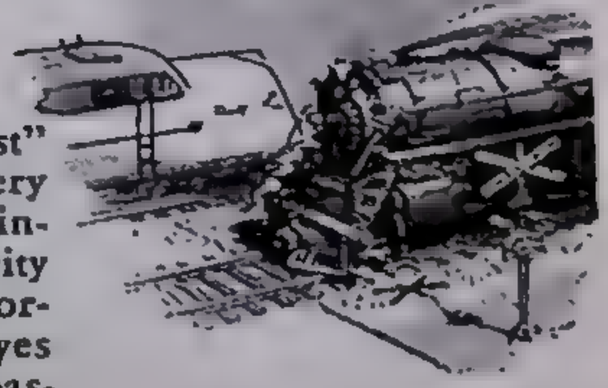
Some years after the turn of the century, "North Western's" Ralph C. Richards delivered an address before a group of employes. His subject was, "Conservation of Men."

Richards was a crusader, in the finest sense of the word. He felt keenly the need for safety education. To him the saving of human life was a sacred duty.

In 1910, thanks to Richards' zeal, "North Western" began systematic efforts to reduce accidents . . . thus the *first* railroad accident prevention organization came into being.

Richards' influence spread. The Father of the "Safety First" movement won recognition from cities, states, industries and other railroads. Finally, came the National Safety Council, the attainment of his long sought ambition. Richards' dream had come true.





Today, "Safety First" is a by-word on every railroad and in all industries. The security of travelers is important; that of employes equally so. Safety measures, too numerous to mention, have been introduced. Along with faster train schedules have come protective devices, such as automatic train control, that have made train travel safer than an evening at home. In the years to come "North Western," always a leader in the "Safety First" movement, will continue to pioneer. *Safety—first, last* and *always!*

CHICAGO and NORTH WESTERN SYSTEM

SERVING AMERICA IN WAR AND PEACE FOR ALMOST A CENTURY

MODERN POWER FOR A MODERN RAILWAY

Speeding Wartime Freight on

THE MINNEAPOLIS & ST. LOUIS RAILWAY

Are Two New Diesel Locomotives of 4,050 Horsepower. Geared to sustained speeds of 65 miles an hour, these Giants of the Rails, each 140 feet long, weighing 690,000 pounds and consisting of three power units, are helping the M. & St. L. to fulfill its pledge of

FINER, FASTER FREIGHT SERVICE FOR THE GREAT MIDWEST

In the picture, the twin engines, No. 445 and No. 545, flank the also new No. 645, sixth in a series of nine combination road and switching Diesels of 1,000 horsepower, built for the M. & St. L. in 1944 and 1945.

These modern locomotives, added to the Road's already efficient motive power fleet, are in daily operation on the M. & St. L. main line. Today, they are moving War Freight to hasten Victory over Japan. Tomorrow, they will be at work on the transportation job of Peace, powering Fast Freight Service via the M. & St. L. and its

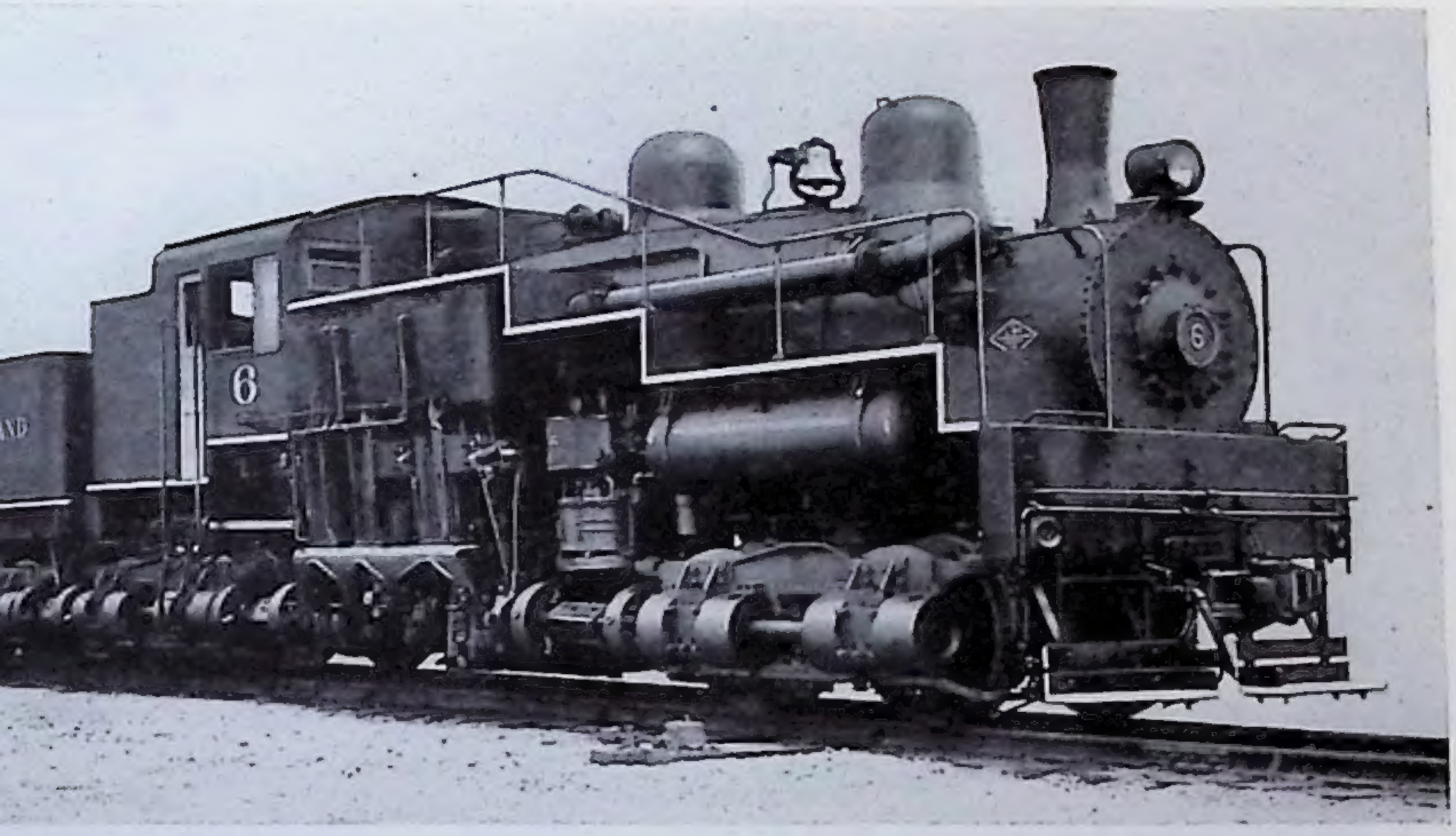
TIME-SAVING PEORIA GATEWAY

THE MINNEAPOLIS & ST. LOUIS RAILWAY CO. — THE PEORIA GATEWAY

The MINNEAPOLIS & ST. LOUIS *Railway*

GENERAL OFFICE, NORTHWESTERN BANK BUILDING, MINNEAPOLIS 2, MINN.

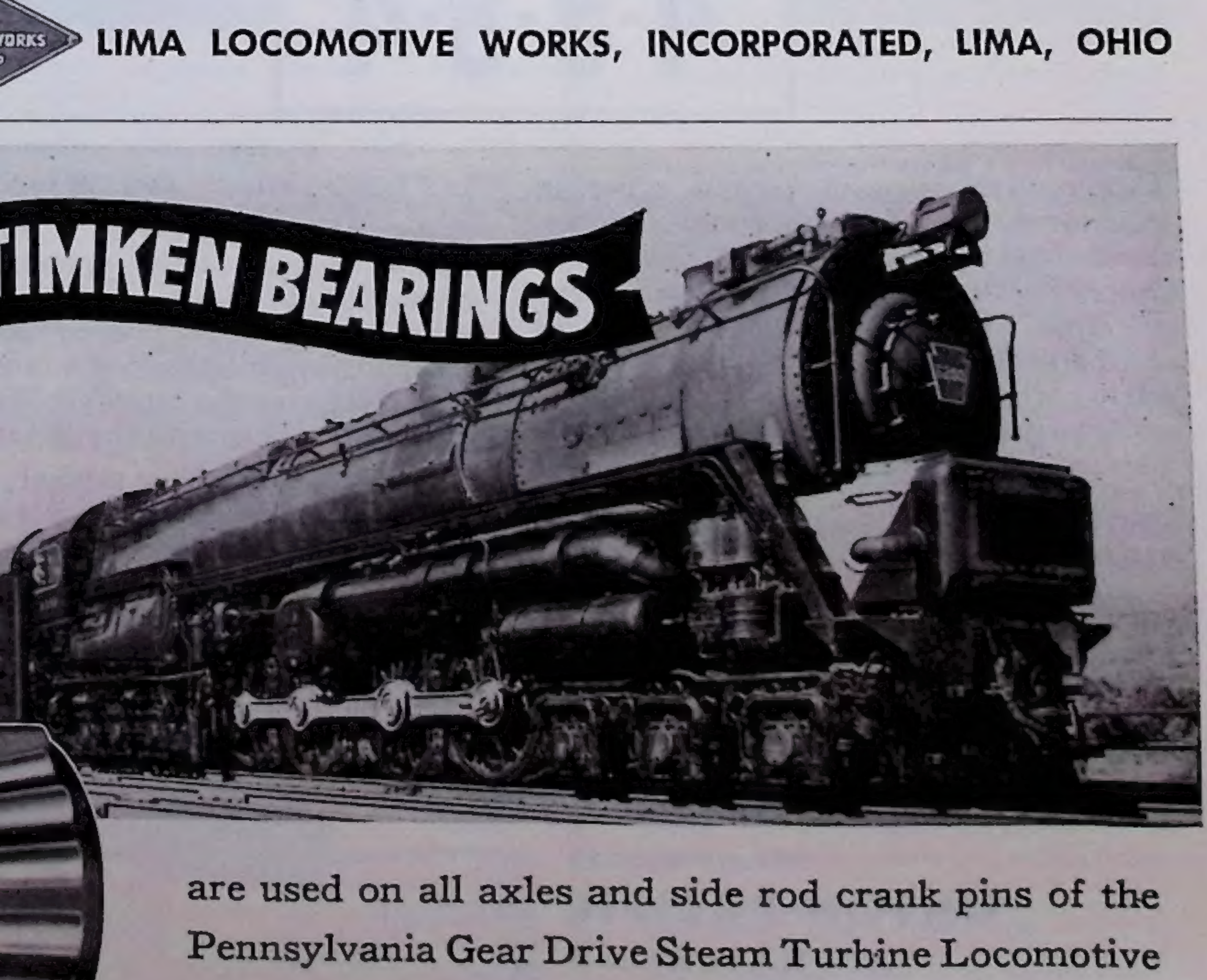
YOU'LL ALWAYS BE GLAD YOU BOUGHT WAR BONDS



10% Grades

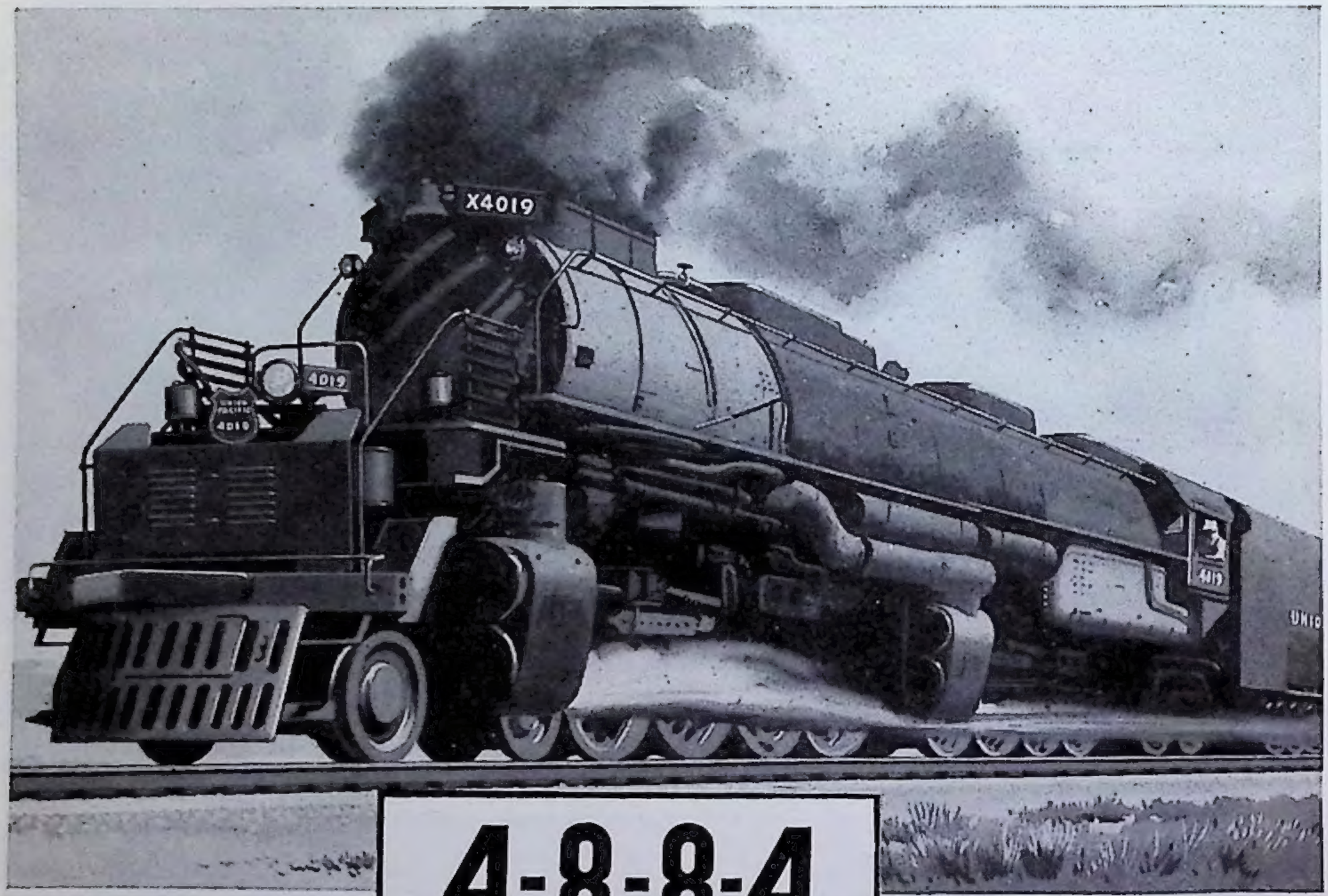
This Lima-built 150-ton Shay locomotive, designed to operate on grades up to 10%, has just been delivered to the Western Maryland Railway to serve coal mines in mountainous country.

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO



are used on all axles and side rod crank pins of the Pennsylvania Gear Drive Steam Turbine Locomotive —first of its kind to be built in the United States.

TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO



4-8-8-4

Railroaders identify various types of locomotives by the number and arrangement of wheels from front to rear. The Union Pacific locomotive pictured above is known as a "4-8-8-4"... two pairs of small wheels in front, then four pairs of driving wheels followed by a similar unit, and two pairs of smaller wheels in the rear—not including the tender.

The "4-8-8-4" type is Union Pacific's largest and heaviest steam locomotive; informally christened "Big Boy" by the men who built it. This giant of the rails is 132 feet in length and weighs approximately 600 tons. Water capacity is 25,000 gallons; fuel 28 tons.

A fleet of 25 "Big Boys" is now in Union Pacific service. Built primarily to haul heavy freight loads on western mountain grades, they have proved invaluable in transporting tremendous quantities of war materials over the Strategic Middle Route, uniting the East with the West Coast.

The "Big Boy" is a typical example of American industrial skill and labor, sparked by the spirit of individual enterprise; the spirit that 65,000 Union Pacific employes are working and fighting to keep alive, to build a bright future for *your America.*

★ Listen to "YOUR AMERICA" radio program on Mutual nationwide network every Sunday afternoon. Consult your local newspaper for the time and station.

THE PROGRESSIVE

UNION PACIFIC RAILROAD

Correspondence

I came up on the Richmond-Washington line the other morning and went into the diner for breakfast. The waiter said. "Ain't got no bacon; ain't got no eggs. Ain't got no coffee, ain't got no butter; ain't got no sugar. What would you like for breakfast?" H. S. Day, New York, N. Y.

Last night on the Pennsylvania Railroad I saw three consecutive diners serving meals on a regular train consisting of 18 coaches in addition to the diners. Have you any record of three or more diners all serving in one train?

J. C. Stansel, 328 Johnston Ave., Trenton 9, N. J.

The narrow gauge White Pass & Yukon broke under strain of wartime traffic early in the war, and was operated until recently by the 770th Railway Operating Battalion. However, the G. I. railroaders pulled out last winter and the civilian owners are operating the road again. About 90 per cent of the equipment in use today was furnished by Uncle Sam. In addition to eight or 10 Baldwin Mikes built in 1943 a few other G. I. locomotives bought from the Colorado & Southern are in use today. All of the cabooses and some box cars came from the C&S and there are a number of standard G. I. freight cars in use. What is to become of this equipment now that the army has returned the road is still under discussion. There is more equipment than the road could possibly use after the war. If required to purchase the equipment the road could easily be bankrupt. At the same time, most of it was obtained expressly for the conditions on the WP&Y and the Army has no use for it elsewhere at present. Cpl. Don A. Bromberg, U. S. Army

Some weeks ago I asked a Pacific Electric Railroad official if the system did not regret having pulled up a lot of their lines which seemingly could be used to good advantage today. He said that increasing taxes, particularly on lines which ran through areas where front footage values were high, made it impossible to operate the lines at a profit and, in consequence, the only thing to do was to substitute busses where the public maintained the right of way in the form of streets and highways. From a business standpoint, of course, this is sound, which puts the blame fully and squarely upon the law makers who create tax values.

Arthur C. Davis, 4130 Vinton Ave., Culver City, Calif.

The French railways have really taken a beating but our transportation corps is quickly getting them back on the ball. Most of their shops have been badly bombed by us, but the remains give evidence of efficiency and convenience. Although most French locomotives are as big as ours, they are not as comely and I can't reconcile their bulk with their peanut vendor whistles. Outside Paris I saw some snazzy Diesel rail cars and some Toonervillish open- and double-decked suburban passenger cars. The mainline rights of way are works of art, even after four years of war. Gerry goes for meter gauge in a big way, judging by the number of neat 0-4-0T jobs of that gauge I saw all over the country.

The Belgian rail cars are much the same as cars on other European lines, but their older locos are very British looking with clean lines, and the newer ones are not un-American in appearance. Capped stacks are universal and the 2-8-0's and 2-10-0's look as if they meant business. Deep-toned whistles sported ahead of the stack make me long for home when they sound off. There are also some semi-streamlined Pacifics which look a lot like the British LNER's Cock o' the North type. The latter type has been changed from 2-8-2 to 4-6-4. Lt. Tom Cameron, U. S. Army.

Running Extra

Tales of the diplomatic antics of C&NW conductors are mounting rapidly. Best of the month was told by Gibbs Allen, state editor of *The Milwaukee Journal*. Gibbs was traveling coach fare on the *"400"* recently when he ran into a long-time-no-see fraternity brother. In short order the two were seated at the bar in the observation car. Gibbs spotted the conductor heading his way, and in anticipation of what was coming said, "Conductor, I realize this is a first class car and that I am riding on a coach ticket, but if you'll give me time to finish this drink, I'll go back to my car again." The conductor looked at him sternly, "You'll have to leave this car, all right, no doubt about that. And I'll have to put a limit on the length of time you can stay. Now let's see . . . You're going to Adams, and we should be there in about two hours. H-m-m-m. Young man, I'm afraid I have no choice other than to order you to leave this car within 2½ hours!" And still looking very official, he was gone.

A few days later, the patriotic conductor of No. 620, which shuttles between Madison and Milwaukee hitting all the milk stops, kept watching a beribboned, obviously lonesome marine sitting halfway down the partially filled car. All attempts at conversation failed to elicite any satisfactory response and the conductor was passing from the desperate into the defeated stage when the train crawled into Deerfield. Here his eye brightened, for on the platform was one of the best examples of American beauty No. 620 had ever had on board. As the conductor reached for the girl's bag, he started talking fast, "Step right this way, miss. Sure is a warm day, isn't it? Now I know this car doesn't look very crowded but we're expecting a rush today and I want to save the double seats as long as possible and I'm sure you won't mind sharing a seat . . ." and still speaking he hurriedly led the girl down the aisle. They stopped next to the marine, who took one look, grinned, and waved aside any explanation. Before the girl had time to say even, "Thank you," her bag was on the rack and she was in the window seat. The conductor tipped his cap, nodded to the delighted marine, and disappeared as the other passengers smiled appreciatively.

Since the beginning of paper rationing we have been forced to cut more than 7000 copies from the newsdealer distribution of TRAINS and many readers are unable to get copies regularly. You can help by passing this copy along when you've finished with it.

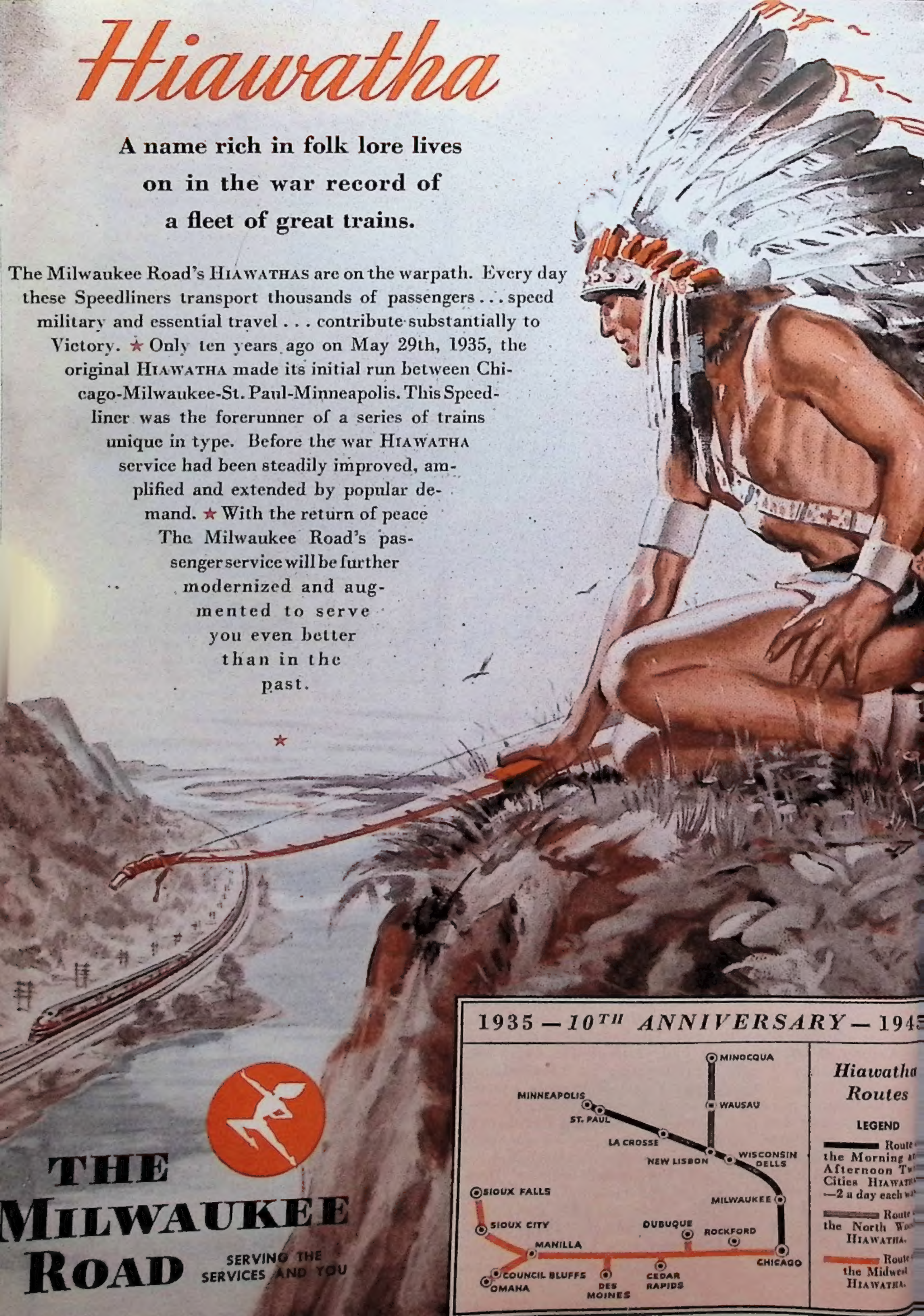
Kalmbach Publishing Co.
1027 N. 7th St. Milwaukee 3, Wis.

Hiawatha

A name rich in folk lore lives on in the war record of a fleet of great trains.

The Milwaukee Road's HIAWATHAS are on the warpath. Every day these Speedliners transport thousands of passengers . . . speed military and essential travel . . . contribute substantially to Victory. ★ Only ten years ago on May 29th, 1935, the original HIAWATHA made its initial run between Chicago-Milwaukee-St. Paul-Minneapolis. This Speedliner was the forerunner of a series of trains unique in type. Before the war HIAWATHA service had been steadily improved, amplified and extended by popular demand. ★ With the return of peace The Milwaukee Road's passenger service will be further modernized and augmented to serve you even better than in the past.

★



THE MILWAUKEE ROAD

SERVING THE SERVICES AND YOU

1935 — *10TH ANNIVERSARY* — 1945

Hiawatha Routes

LEGEND

Route — the Morning a Afternoon Tw Cities HIAWATH —2 a day each w

Route — the North Wo HIAWATHA.

Route — the Midwest HIAWATHA.